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Sir Brian Robertson Gets to Work

IN his first message to the employees of the British Transport Commission, the new Chairman, Sir Brian Robertson, has expressed his intention of getting out and about and meeting as many workers in the various nationalised transport undertakings as possible. The substance of his message is given on another page. During the fortnight since he arrived back from Egypt to assume his duties, he has been as good as his word in not, as he puts it, "spending all his time polishing the seat of his office chair," but inspecting and visiting railway installations and the staff employed in them, and examples of his activity in that direction are given elsewhere in this issue. Since the abolition on October 1 of the Railway Executive, before which date its Chairman, Mr. John Elliot, was very active in meeting railwaymen of all grades and in seeing things for himself, the Chairman of the Commission is the man seen by railwaymen, under the interim organisation of nationalised transport, as the visible head of British Railways. Sir Brian Robertson has lost no time in making a friendly approach to the trade unions, expressing his confidence in gaining their goodwill because, as he says, he is no stranger to them, in the light of his previous industrial experience. One of the more urgent problems facing him is that of railway wages, where the decision of the Railway Staff National Tribunal is awaited on claims by the three railway unions; whatever the Tribunal decision, important consequential decisions will have to be made by the Commission. Elsewhere in his message the new Chairman gives a warning of the added keenness of the competition which the railways will have to face in the future. He also mentions the unsettling effect of recent reorganisations and stresses the insufficiency over a long period of capital expenditure on the railways; on the latter he states: "It is up to me and my colleagues to find the necessary money somehow," adding that a good case must be made if funds are to be made available.

Indian Locomotive Orders

THE total number of locomotives ordered by the Indian Government under its 1954-55 programme is now announced as 480 and the cost is Rs.180,000,000 (£13,500,000). In addition to the orders placed in Germany, Austria and Japan, which we have already recorded, the Italian firm of Ansaldo is to supply 25 "WG" locomotives. The order placed in Japan is now given as for 125 locomotives, of which Hitachi is understood to be supplying at least 75, of the "WG" class. As well as 150 "YP" locomotives Krauss-Maffei is to supply 20 diesel-shunting locomotives. A statement by Mr. F. C. Badhwar, Chairman of the Railway Board, giving these additional figures, says that British locomotive manufacturers were unable to secure a share of these orders because their quotations were not competitive. The orders, he adds, were placed in countries where manufacturers offered "good quality, suitable delivery dates, and reasonable prices." Mr. Badhwar's reference to price is understandable and is a sharp reminder that British manufacturers will have to find means of offering fixed prices if they are not to lose important markets, but the reason for his emphasis on the other requirements is not clear. The standard of British locomotive workmanship is as high as ever and it is known that the delivery period required by India was within the capacity of British contractors. As we reported in our November 13 issue, the Railway Board is negotiating to obtain by the end of 1955 a large number of locomotives under foreign aid programmes. The total stated by Mr. Badhwar is 250-300 and it is believed that Canada is in the market for at least 100.

Nigerian Railway Progress

IN our October 9 issue we dealt at some length with the progress which has been made by the Nigerian Railway over the last few years, but in our comment we did not do full justice to the administration, for the increase in gross earnings between 1928 and 1953 have been nearer £8½ million than the £7½ million that we gave. This railway until 1927 was operated as a Government department. In that year the railway accounts were separated from the Government budget. A further change is now in process of taking place, for the railway is to pass into the control of a corporation headed by Colonel R. B. Emerson, when the necessary legislation has been passed, probably some time next year. For many years the Nigerian Railway was the largest colonial system and it was not until the fusion of the Kenya & Uganda and Tanganyika Railways in 1948 that it took second place. It is a very large purchaser of equipment from United Kingdom buyers and at the present time it has orders outstanding in this country for locomotives, coaching stock and wagons to an approximate value of £4 million.

Lord Glenavy on Irish Transport

TRANSPORT facilities in Ireland far exceed the traffic which needs to be carried, in the view of Lord Glenavy, who was Chairman of the Great Northern Railway (Ireland) until its acquisition by the Governments of

the Republic and of Northern Ireland in September. Lord Glenavy, who was proposing a vote of thanks to Professor B. F. Shields for the paper on financial and operating statistics of Coras Iompair Eireann and the G.N.R. which he read to members of the Statistical & Social Inquiry Society of Ireland in Dublin, likened Irish transport to "a rudderless ship floating around without a compass." He referred to the losses incurred by all railway systems in Ireland in recent years, during which time it had been the principle that employment in public transport should not diminish and said that the consequence was the "very curious situation" that a large number of persons was being subsidised by the rest of the community to maintain services for which, he alleged, there was no adequate demand. We think that the problem in Ireland is rather one of ensuring that each means of transport is used in its proper sphere. Closer integration of rail and road services in Border districts is one of the matters now being investigated by the new Great Northern Railway Board.

"Princess Victoria" Appeal Judgment

THE Lord Chief Justice of Northern Ireland Lord MacDermott, with three technical assessors, gave judgment in the High Court last week dismissing the appeal of the British Transport Commission against the findings of the Court of Inquiry into the loss in the North Channel on January 31 of British Railways s.s. *Princess Victoria*. A brief account of the proceedings is given elsewhere in this issue. The High Court has allowed the appeal by Captain J. D. Reed as Manager of the Irish Shipping Services of British Railways and has modified some of the findings of the lower court against the Commission; but it upholds the Court of Inquiry in its view that the owners, after the incident in 1951 when heavy seas damaged the stern doors of the vessel and flooded the car deck, ought to have appreciated that the ship was vulnerable and to have acted accordingly. The matter is to be debated shortly in Parliament. Meanwhile even before the hearing before the Court of Inquiry, prompt steps had been taken by British Railways to effect alterations in vessels equipped with stern doors, and all technical questions raised by the loss of the *Princess Victoria* have been under thorough examination for some months past.

Bridging the Ganges at Mokameh

EXECUTION of the plan for a rail-and-road bridge over the Ganges at Mokameh, for which tenders have been called, as recorded on another page, will break the 500-mile stretch of the river unbridged between Benares and the Naihati Bridge in the environs of Calcutta, and improve freight traffic facilities between the thickly populated agricultural districts of northern Bihar, and Calcutta. As the details in the tender notice show, the bridge will be one of the world's major engineering works. It will not, however, dispense with break of gauge. The Eastern Railway (former East Indian) lines on the right bank of the Ganges are 5 ft. 6 in. and those of the North Eastern (former Bengal & North Western and later Oudh & Tirhut Railway) on the left bank are metre gauge, so that transhipment still will be necessary. The gauge of the railway over the proposed bridge is to be 5 ft. 6 in. The existing wagon ferry conveys metre-gauge wagons, with transhipment on the right bank, so that a new transhipment yard on the left bank will be necessary. The new bridge and associated works are expected to take six years to complete.

Suggested Welded Truss-Girder Bridge Design

THERE exists a school of thought which advocates the adaptation of certain modern design philosophies and trends in welded building and other structures to the design of truss-girder bridges. So much is clear from a paper entitled "Design, Fabrication and Erection of Trussed Girder Bridges," presented by Mr. E. M. Lewis to the Conference on Welded Structures, 1953, for discussion on November 26. He suggests that welded truss-girder bridge design, instead of being fettered by existing regulations, should benefit from welding experience gained in the whole sphere of engineering, and that the resulting design be then examined to ascertain in what respects it does not conform to those regulations. If the design is proved by tests and research work to be sound, an endeavour should be made to secure a modification of the regulations. The author considers, for instance, that the plastic theory, believed to be inadmissible by any existing regulations, might well be considered in relation to such bridge design. He then describes a number of what he considers suitable general and detail designs and discusses materials, methods of fabrication and erection, as well as maintenance problems, to illustrate his argument that a completely new approach to welded work is necessary.

Collision under "Stop and Proceed"

THE collision near Stratford on April 8, 1953, on the Central Line, by which twelve passengers lost their lives, was the worst ever to occur on the London underground system, exceeding that between Charing Cross and Temple on May 17, 1938, which involved six passenger fatalities. It took place at practically the same spot as the one on December 5, 1946, the day after the extension from Liverpool Street was opened as far as Stratford, but in that case the trains were empty; one railway servant was killed. Both accidents arose from failure to drive with sufficient care under the "stop and proceed" rule, after passing a signal held at red by some interruption to the signalling circuits. As will be seen from our summary in this issue of Colonel D. McMullen's report, the damage done indicated a colliding speed of about 20 m.p.h. Evidence on some points was conflicting, but there is little doubt that the motorman had somehow gained the impression that the line was in fact clear to the next signal. The serious injury and shock which he suffered are thought to have affected his recollection, so that he believed the dust created by the accident to have been present before it. It is not practicable to abolish "stop and proceed" working on such lines, as very great dislocation of the services would result; and short of providing means of compelling obedience to a low speed limit, proposals for which are under consideration, all that can be done is to impress on drivers the absolute necessity of seeing the way is clear ahead and of paying no attention to what someone else says about it. Such person may himself be mistaken.

Safety on the London Underground

THIS accident, serious as it was, has but served to emphasise what an extraordinarily high degree of safety has all along obtained on the underground lines in London. It is the first attended with death to passengers to occur on a tube section of railway since the City & South London line was opened to the public between the City and Stockwell on December 18, 1890, a truly remarkable result. How many have travelled through the tubes since then we are unable to say but the figure must be astronomical. On other sections of line the results have been scarcely less impressive. Until the accident near Charing Cross on May 17, 1938, no passenger had met his end in a train accident on the District Line since January 29, 1876, when one did so in a slight collision just west of Earls Court. On the Metropolitan line the situation was the same. There was no train accident fatal to passengers from the opening of the first section on January 10, 1863, until October 26, 1907, when, following fraudulent manipulation of a piece of equipment, two electric trains collided at West Hampstead and three were killed, by which date over 3,000 million had been carried. A passenger, already very ill, succumbed to shock following a slight collision at Baker Street on June 14, 1925, and on December 31, 1945, there was a collision near Northwood, under "stop and proceed," on the Metropolitan & Great Central Joint Line, when three passengers lost their lives. These and the recent Stratford case are all the "train" accidents we recall fatal to passengers since London first had an Underground, 90 years ago.

Pre-1900 Southern Locomotives

THE publication in book form of Mr. E. L. Ahrons' articles entitled "Locomotive and Train Working in the Latter Part of the Nineteenth Century"—the fifth volume of which is the subject of a brief notice elsewhere in this issue—provides a corpus of information and recollection on engine working in that era, the latest volume dealing with the railways now forming part of the Southern Region. As long ago as 1888, the L.S.W.R. timetables showed several fast start-to-stop timings, such as Basingstoke-Woking, 23½ miles in 28 min.; Yeovil-Exeter ticket platform, 48½ difficult miles in 63 min.; Cannon Street-Dover, 75¼ miles in 96 min.; Herne Hill-Dover Town, 74 miles in 94 min.; and, presumably with an intermediate stop, Cannon Street-St. Leonards in 91 min., five minutes faster than the best train today. Another reminder is that L. & S.W.R. No. 446 4-4-0 was converted in 1888 as a Worsdell two-cylinder compound and ran as such for three years. Also, that the dual Cudworth firebox was freely used. It was divided down the centre by a water-space and had two steeply-inclined grates 7 ft. 6 in. long but only 1 ft. 6 in. wide. The L.B.S.C.R. was the first line to introduce the flying junction, and later had more of them than any other railway.

Economic Principles and Railway Charges

AN indication of the extent to which commercial economic principles are related to practice in the work of determining railway charges has been given by Mr. F. Grundy, Assistant Commercial Superintendent, British Railways, Western Region, in his paper read recently to the Railway Students' Association of the London School of Economics. He explains that after a complete budget of estimated expenditure for the following year has been obtained from all departments, including the commercial department's own estimate for clerical labour, station working, cartage, and so on, the commercial officers are asked to produce a revenue budget to cover expenditure and produce a surplus sufficient for an appropriate contribution to central charges. The commercial officers examine the most recent annual revenue total and its analysis in relation to the various types of traffic, and weigh the many factors affecting not only railway economics but the situation of national trade and industry.

So far as freight is concerned, a study is made of the Government "Annual Economic Survey," and of economic and trade journals, and the reports of local commercial officers, and particular attention is paid to items such as the condition of the import and export markets, production and trends in the principal industries such as steel, coal, and agriculture, new industrial developments, defence programmes, employment figures, the probable competitive effectiveness of other forms of transport, the likely volume and trend of claims payments, and the current trend of railway receipts and expenditure. With all these factors in mind, and an analysis of existing traffics, an estimate of freight tonnage likely to be conveyed during the following year, with anticipated receipts therefrom, is prepared in collaboration with the accountants. On the passenger side, special attention is paid to the employment figures, the general wages position, the incidence of great national events, and the competitive possibilities of such alternatives as television, private cars, and so on. Existing traffics are analysed into types of fare at various mileage gradations and much thought is given to transport competition. Separate consideration must be given to each section of the commercial activities besides freight and passengers, such as parcels, for which there is keen competition; coal and coke, where close contact must be maintained with the National Coal Board, and so on; livestock, much of which is controlled by the Ministry of Food; and to other traffics.

If at current levels of charging the traffic estimates would not produce the necessary revenue, consideration must also be given to seeking a general increase in charges, either all round or on certain sections of the traffic. Great care must be taken in estimating the elasticity of demands for transport, allowances made for potential loss of business through raising charges. Assuming some general increase is necessary, the Commission embarks on the statutory procedure for seeking an increase. As regards the charges schemes which the Commission was enjoined to submit to the Minister of Transport under the Act of 1947, Mr. Grundy points out that the nature of the schemes was left to the imagination of the Commission, though with freight traffic "integration" obviously was intended to be one of the objectives. The fact that most of the proposals of the recent passenger charges scheme were approved by the Minister shows, in his opinion, that the advice of the commercial officers was economically sound.

The freight charges scheme prepared by the Commission, with the draft outline of its principles published as a basis for discussion with traders, provided for some measure of "integration" in classification and conditions of carriage regulations and chargeable distances, and proposed "loadability" as the main factor in the classification as against "value" or "what the traffic will bear" under the Railways Act, 1921. With the change of transport policy after the present Government took office in 1951, the abolition of the Road Haulage Executive, and the sale of British Road Services vehicles under the Transport Act of 1953, the "integration" principle by charging has been discarded and distribution of traffic between road and rail will be largely determined by cost of service; and a new scheme for freight charging is to be produced by the Commission for the railways only on a basis of authorised maximum charges. Whatever scheme is devised, Mr. Grundy states, scales of maximum charges must necessarily be related to the classification of traffic. As unrestrained competition would be in nobody's interest, it seems essential that the new charges should be capable of attracting business, whilst covering the cost of providing the service. The second requirement is hard to assess, but the new Traffic Costing Service established both centrally and in the Regions will enable commercial officers to receive the best possible current costing advice.

In the Regions, after the charging schemes and general increases have been introduced centrally, the quotation of exceptional freight rates and the introduction of cheap fares is the duty of Regional commercial officers. Thus with passenger charges, there is the complex task of quoting cheap fares to provide profitable employment for largely unused or marginal off-peak capacity or to create business whilst imposing conditions to protect the main body of passenger revenue. Where special train working is involved the revenue possibilites are first compared with the costs guide provided by the Costing Service.

In the quotation of exceptional freight rates Mr. Grundy shows that apart from the considerations to be taken into account in framing a new freight charges scheme under the Act of 1953, business has to go on under present charging and probably will have to continue for some years with road competition probably increasing in severity as the sale of nationalised road transport vehicles develops. Exceptional rates, he points out, are granted largely on the basis of need to maintain reasonable consistency with existing rates for the same class of traffic moving in similar circumstances, where despite the legal release from undue preference as between one trader and another, commercial practice continues to demand a broad state of equilibrium; on commercial concessions in consideration of regular streams of traffic; on help in developing trade which otherwise would be restricted or fail to materialise; and on competition by other forms of transport. At the same time, current quotation of exceptional rates will have to be based on sound economic principles if cut-throat competition such as obtained before the war is to be avoided. The rates quoted must be attractive yet cover the costs of providing the service. Costing officers have been appointed to each of the Regions, and the Regional Rates Assistants have been provided with costs scales in respect of traffics in the various classifications. If a transaction seems much over the average line of cost per ton for the traffic concerned no problem

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arises, but if the rate demanded falls below the average cost of this type of traffic then the Rates Department would ask the Costing Service for a special investigation into the particular flow of traffic.

The Costing Service can be equally valuable in promoting operational progress by demonstrating that conventional methods are too costly and that new methods must be introduced if profitable rates are to be quoted and traffic secured against competition. An investigation now being undertaken by the Costings Service is that connected with the costs and receipts from ordinary passenger train services. This examination will by analysis enable the profitability of the various types of services to be considered so that after ascertaining where the profit or loss lies, consideration can be given to economy or operation, to the possibilities of traffic development, particularly during off-peak periods.

Mr. Grundy emphasises that costing in relation to revenue is by no means a recent development. In passenger traffic, costs per train mile of special train working have been available for many years against which receipts per train mile could be compared. On the freight side the rates under the 1921 Act were based on charging by classification of traffic. Road competition undermined some sections of the classification to such an extent that, in effect, " road costs " largely became the criterion of rail freight rates. A similar situation arises where competition is with "C"-licence vehicles. The railways have had for many years within their own organisation the means of checking road transport costs.

E.C.A.F.E. Report on European Tour

THE intensive research organisations of the British and other Western European railways particularly impressed the members of the Railway Sub-Committee of the Economic Commission for Asia & the Far East when they visited France, Great Britain, the Netherlands, Western Germany, and Switzerland in October. Although the large-scale mechanisation of track maintenance and freight handling equipment in depots, and in other respects, on which European railways are concentrating attention is of less interest to Asia where labour is still cheap and abundant, the members consider that more mechanical devices might be used in their countries. Their suggestions to this effect and others are embodied in a report on their tour, published by E.C.A.F.E. in Bangkok, which goes far to show the large amount of railway equipment of all types which these systems have under active consideration.

The delegates, who included senior railway officers from Burma, Cambodia, China, India, Indonesia, Japan, Malaya, Pakistan, Thailand and Viet-Nam, advocate that research centres should be set up by their railways to determine the most suitable packaging which can be made from local materials. This would reduce loss and damage caused by mishandling and would lessen the number of claims. The greater use of metal containers and fork-lift trucks is also favoured. Types of concrete sleepers seen in France and Germany are recommended for trial. Supplies of timber for sleepers are reported to be dwindling in Asia, but it is considered that the problem would be largely solved by using such concrete sleepers, provided that the fittings proved durable in Asiatic conditions. As the difficulty of rail expansion and contraction caused by variation in temperature has been overcome by holding the rail rigidly and letting it take up the stress and strain within itself, it is thought that long-welded rails, now well established in Europe, could be widely adopted in Asia. The advantages are that the cost of upkeep is low, the rails last longer, and riding is improved. In addition, old rails with ends chopped off may be re-used after welding.

Types of main line and shunting diesel locomotives, with electrical, mechanical and hydraulic transmission, were inspected during the tour, and wider use of small diesels for shunting was recommended. Before beginning the tour, the Railway Sub-Committee met in Paris from October 5-10, the first time that an E.C.A.F.E. conference had been held outside Asia. Representatives attended from 16 countries, and there were observers from the International Union of Railways and the International Chamber of Commerce. Besides the topics of interest in connection with the visit of inspection, a number of other matters came up for review, in particular the prevention and speedy disposal of claims, the forthcoming inauguration of the training centre for Asian operating and signalling officials, and the treatment of water in locomotive boilers.

The railway training centre, situated in Lahore, is due to open in January. The project has been undertaken jointly by E.C.A.F.E. and the United Nations Technical Assistance Administration. Earlier this year a group of Asian railway officers completed, under the auspices of those two bodies, a world study tour to prepare recommendations for a suitable curriculum and suitable equipment for the centre. The United Kingdom, the Netherlands, France and Japan are among the countries which have contributed equipment.

Cables for Railway Signalling

THE introduction of the electric telegraph, as a practical commercial device of general application rather over a century ago, necessitated the manufacture of insulated wires and later their assembly into cables, in which activity remarkable progress was soon achieved. In particular there deserves to be remembered the courage and initiative displayed by those who ventured on the construction of submarine cables and attempted, although meeting with failure on the first occasion, to span the Atlantic and put the Old World and the New into instantaneous communication. Little imagination is needed to picture the thought and care required to produce first the materials needed, then the machines able to form the long continuous lengths of cable, and finally the equipment and organisation indispensable to laying and working it under difficult and little known conditions. From such plucky efforts of the early pioneers has come that very extensive branch of industry which today manufactures wires and cables of every conceivable type, size and form, for the numerous ever extending fields of electrical engineering that have sprung up since the discovery of the magneto-electric generation of energy took it beyond the realm of telegraphy, and opened up seemingly endless opportunities for the application of the electric current.

A very important, if less generally noticeable section of this field is the use of insulated electric conductors in railway signalling, itself originally a simple extension of telegraphy. Although long employing power derived entirely from batteries, save for one or two forms of block apparatus actuated by magneto-generators, and keeping generally to modest voltages, the necessity for achieving very great freedom from failure, on safety and other grounds, early directed attention to the need for wires covered with a reliable protection, one able to give reasonable security against electrical breakdown and withstand satisfactorily the mechanical stresses and physical and chemical effects to which it would be subjected during both installation and subsequent service. Nor could the economic factor be ignored; the product had to be something the railways could afford to purchase. Everything had then to be learned. There was no experience to go on and many are the failures of this or that type of insulated wire recorded in works dealing with the early days of telegraphy. Considering the great difficulties to be contended with the progress achieved in a few years was highly creditable. The ordinary block telegraph and other comparatively simple signalling devices were soon functioning very satisfactorily, and few accidents were ever attributed to serious failures of them, notwithstanding that often the circuits themselves were not always designed on what later came to be admitted to be the correct principles.

With the application of electric power to the operation of points and signals a new phase was entered on. The seriousness of the results that could follow from any break-

down in a circuit tending to put it into connection with some other naturally was recognised, as well as the consequent necessity of using first class cabling and wiring, while engineers exerted themselves with much ingenuity to devise circuits which should be proof against such false cross connections. A number of these proposals found application, but it was seen that, though they might be valuable, fundamentally the problem was to obtain such fine quality material that, provided fair maintenance could be ensured, the risk of at least a dangerous failure would be extremely remote. A great many types of insulation and methods of applying them to wires—singly and in cable—were developed and a great amount of experience accumulated as time passed, on which to base further investigation and endeavour. With their claims we are not here concerned, but it may be said that nobody can doubt that in the matter of signalling cables especial care is called for before making any change from well tried types.

Some economical and technical aspects of this question were brought before the Institution of Railway Signal Engineers on November 18 in a discussion opened by Mr. N. W. Russell who has for many years been inspecting and receiving cables and wires on behalf of the railways. Keeping to cables he gave a number of details covering types of insulation, etc., in use or tried at various times, with electrical and other relevant characteristics. One view advanced was that perhaps an unnecessarily high standard of insulation was being called for, at least for some classes of work, and that money might be saved and as one speaker pointed out, be used to extend the latest types of signalling where they are much needed were something of a lesser grade to be used, under defined precautions Cabling is a very costly item in the highly developed signalling of today, so that this view appears deserving of consideration. There is, of course, a very natural and strong reluctance to lower any standard in such important work, but an old adage says there is reason in all things and the practical problem in such a case appears to be to establish where to draw the line and on what grounds. We have to be satisfied with reasonable margins of safety in numerous instances in railway engineering and presumably cables form no exception. We should like to see a debate, bringing to light the considerable amount of practical experience now available on this point, to give some guide on which to arrive at positive conclusions in a scientific manner.

Forty Weeks of Railway Statistics

(By a Correspondent)

NUMBER 10 of *Transport Statistics* merits attention on account of certain "aggregates," which partially represent the performance of British Railways during the 40 weeks to October 4. The "aggregates" cover the last three days of 1952 and include some traffic comprised in the annual returns for that year, but they indicate current trends correctly for there has been little change in the tendencies influencing railway operations since 1948. We may learn something from a comparison between the statistics for rather more than three-quarters of this year and those for the first five years of nationalisation. In the analysis below it will be convenient to speak of the 40 weeks in question as 1953.

At first sight an originating freight traffic of 218,333,000 tons in 1953 appears satisfactory as it represents an increase of 2,762,000 on the corresponding weeks of 1952. The whole of this improvement of 1·3 per cent in tonnage was, however, caused by increases of 1,494,000 tons in minerals (3·2 per cent) and of 3,023,000 tons in coal and coke (2·3 per cent). Merchandise decreased by 1,749,000 tons (4·5 per cent), continuing a trend which has persisted since 1948, save for a slight check in 1951. The table below shows the downward drift in merchandise forwardings from the inception of British Railways and also the fall in ton-miles attributable to merchandise (including livestock) since 1951. Whereas in 1948 merchandise constituted 19·8 per cent of the total tonnage, in 1953 the percentage was 16·8; over 6,000,000 tons of high-rated traffic were lost in six years. The proportion of the total ton-mileage produced by merchandise fell from 31·2 per cent in 1950 to 29·8 in 1953, though the average haul lengthened by about six miles in the interval.

MERCHANDISE TRAFFIC, 1948-1953
(Millions)

Year	Tons	Increase or decrease per cent	Per cent of total	Ton-miles	Increase or decrease per cent	Per cent of total
1948	54·7	—	19·8	—	—	—
1949	53·9	− 1·5	19·3	—	—	—
1950	52·9	− 1·8	18·8	6,924	—	31·2
1951	53·2	+ 0·6	18·8	7,077	+ 2·2	30·9
1952	50·2	− 5·7	17·6	6,817	− 3·7	30·4
1953	36·8	− 4·5	16·8	5,139	− 1·6	29·8

The change in the build-up of traffic reduced wagon loadings and had a marked effect on train and yard operations. Between 1948 and 1952 wagon loadings dropped from 36,431,000 to 34,978,000, a decrease of 1,453,000. In 1953 a further decrease of 249,000 loadings occurred by October 4 and it seems probable that by December 31 British Railways will have carried at least 2,000,000 fewer wagons of merchandise than in 1948, but may have hauled about 110,000 more wagons of minerals and 280,000 more wagons of coal. Now merchandise, loading to less than four tons a wagon and being widely distributed, entails more shunting than minerals or coal, which both load to over eleven tons a wagon and frequently move in large quantities between the same places. Between 1948 and 1951 shunting engine hours dropped from 19,204,000 to 17,774,000, a decrease of 1,430,000, of 7·4 per cent, due largely to the abolition of private owners' wagons and to through working made possible by the postwar state of trade, industry and transport. It is significant that in 1952, when 607,000 fewer wagons of merchandise were forwarded than in 1951, shunting engine hours were 533,000 less and a further decrease of 425,000 merchandise wagons in 1953 marched with a reduction of 306,000 in shunting engine hours.

To October, 1953, the replacement of merchandise by minerals and coal raised ton-miles by 1 per cent. In working the extra traffic volume 12,000 additional train engine hours were incurred, though 11,000 fewer train miles were run. The hourly output of freight train operation, measured by ton-miles per train engine hour, rose to 1,149 against 1,143 in October, 1952. The output is likely to decrease in the last 12 weeks of 1953, but should be higher than the figure of 1,133 for the whole of last year. On the other hand there does not seem to be a firm prospect of freight train speed being faster than the moderate rate of 8·65 m.p.h. in 1952. Comparing the results of freight train working in 1948 and 1952, output has increased by 7·5 per cent and train speed by nearly 6 per cent.

Over the same five years the American railroads improved productivity by 20 per cent to 22,567 (short) ton-miles in a train hour—a new record for the sixth consecutive year—and raised train speed by 8 per cent to 17·6 m.p.h., calculated on a basis that takes into the reckoning 20 per cent of train engine hours spent in shunting at stations. In recording this result, Dr. Julius H. Parmelee, to whose statistical work *The Railway Gazette* paid an appropriate tribute in its November 20 issue, wrote "capital improvement programmes, carried out at great cost in both 1951 and 1952, contributed heavily to these efficiency achievements of 1952. In particular, railroads continued their almost revolutionary policy of substitution of diesel for steam power." The policy adopted in the States means that the most flexible method of applying electric power to traction has supplanted the steam locomotive, save for working lines with a scanty traffic, and also the electric locomotive with its costly line equipment and limited sphere of action. Unless British Railways revise their ideas about the use of diesel traction, they may be left in the lurch before long.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Experiment in Traction Practice

November 28

SIR,—I refer to the editorial article in your November 27 issue. It would seem that although replacing axle-hung motors by motors rigidly mounted on the bogie frames gives vastly improved riding qualities and reduces maintenance costs, the next logical development is to remove them to the coach underframe itself. I believe it to be possible, even within the limits of British or of metre-gauge loading gauges, to design a motor coach of 1,000 h.p. or more with only two motors, and a consequent saving in cost and in weight.

What I envisage is a vehicle of integral construction, with two 500-h.p. motors carried, with control gear, on a resiliently mounted sub-frame, and driving the inner axles of the bogies through cardan shafts. The total weight of such a motor coach ought not to exceed 40 tons, distributed with 12 tons on each inner (driven) bogie axle and eight tons on each outer axle, with the bogie turning centre (or pivot, if fitted) nearer to the inner than to the outer axle.

As to the latter connection, whilst the riding qualities of most British multiple-unit electric stock are not good, the least unsatisfactory riding seems to be that of modern London Transport surface line stock, with assymmetric bogies and one motor per bogie.

Yours faithfully,

JOHN RODGERS

"The Cottage," 132, Worrin Road, Shenfield, Essex

Through Services from Channel Ports

November 26

SIR,—One reason why through services avoiding London are not provided is that British Railways, continuing the practice instituted by the Southern Railway, do everything possible to get people to use the boat trains from Victoria. There is an extra charge for the boat trains as such, and also the entirely unnecessary provision of second class coaches, at very nearly first class fare. British Railways insist that special facilities are provided, such as harbour terminals and so on, but decline to say why there is no extra charge on trains to Harwich Parkeston Quay and other packet ports.

Yours faithfully,

H. C. HOSKIN

123, West Street, Sheffield 1

[Special boat train fares between London and Dover and Folkestone date back many years and relate to the expense of operating the trains; they were specifically authorised by the Transport Tribunal in its confirmation in July last of the B.T.C. Passenger Charges Scheme, 1953. The premises on which boat trains work at Dover are those of the Dover Harbour Board. Parkeston Quay is B.T.C. property. Second class accommodation is provided in boat trains for through-booked second class passengers.—ED., *R.G.*]

Publications Received

Switzerland's Amazing Railways. By Cecil J. Allen. London: Thomas Nelson & Sons Ltd., 3, Henrietta Street, W.C.2. 9 in. × 6½ in. 176 pp. + 95 pp. plates. Price 25s.—No country can show greater diversity in its railways than Switzerland, with its 3,500-odd miles of line, a surprisingly high total when the smallness and mountainous nature of the country are considered. Several chapters are devoted to these lines. The Alpine tunnels and other famous works and the battle against snow and ice are described in detail. Of particular value is an appendix with tabular information, not before available in English, on the mountain lines, gradients and summits on adhesion lines and high-speed runs.

Locomotive and Train Working in the Latter Part of the Nineteenth Century. Vol. 5. By E. L. Ahrons. Cambridge: W. Heffer & Sons Ltd. 9 in. × 6 in. 131 pp. Illustrated. Price 15s.—The subject matter of this volume was contributed originally by Mr. Ahrons to our associated contemporary *The Railway Magazine*, who published it in a series of articles between 1917 and 1925 with the title above. It covers a wide field in describing the South Eastern, London Chatham & Dover, London Brighton & South Coast, London & South Western, Somerset & Dorset, Metropolitan and Metropolitan District Railways as they were worked prior to 1900. The book is a valuable reminder of the general conditions then obtaining and in particular those of the mechanical and motive power side of their operation. It is ably edited by Mr. L. L. Asher, who has retained as far as possible unaltered Mr. Ahrons' characteristic descriptions of all the principal locomotive designs and their peculiarities and performance, besides many oddities. Reference to some of these remarkable features is in an editorial note in this issue. The illustrations are well chosen, and the work as a whole is a worthy memorial to the author of the original articles.

Fittings for Light-gauge Copper Tubes.—Details of various types of fittings suitable for hot or cold water services, lubricating oils and so on, are given in a leaflet issued by Fyffe & Co. Ltd., Dundee, a subsidiary of Imperial Chemical Industries Limited. Types enumerated include the Instantor, Coneor, and DD fitting; the last is manufactured in a nut or flange pattern, for which form tools are available on loan. The fittings are particularly suitable for use with light-gauge copper tubes, and Alkathene plastic. The flanged pattern type DD, is made in sizes from 2½ to 8 in. nominal bore. The other types are supplied in sizes from ¼ to 2½ in.

The G.E.C. During Six Reigns.—An electric tramcar illustrated in an early edition of its catalogue proclaimed the readiness of the General Electric Co. Ltd. to participate in the field of electric traction during the reign of Queen Victoria. Among landmarks in the company's progress up to the present time illustrated in this brochure are various railway contracts, such as the Brighton section single-phase stock of 1922 and the M.S.J. & A. 1,500-V. d.c. equipment of 1931. An illustration of pumpless air-cooled rectifiers at the L.T.E. Putney Bridge substation recalls the important position held by the company in the design and supply of fixed equipment for railway electrification. Other transport activities represented include the laying of high-voltage cables for power supply to electrified lines, and the interior lighting of rolling stock.

Properties of Copper-Manganese-Tin Alloys.—The Tin Research Institute has recently issued an illustrated booklet which describes a range of new copper-manganese-tin alloys which may be useful in fields hitherto served by nickel silver, and which meet the demand for a white metal with good mechanical properties at a competitive cost. It can readily be cast, forged, rolled, stamped, and so on, and has an adequate resistance to corrosion, and is also satisfactory as a basis metal for plating finishes. Detailed information is given on the properties of a wide range of compositions, and indicates how compositions and methods of treatment may be varied to give strength and deformability as may be required. Of interest is the fact that the new alloys may effect a useful economy in nickel during the present scarcity. The research work was carried out in the laboratories of the Tin Research Institute.

THE SCRAP HEAP

Nationalise Me First

A transport owner waited until nationalisation before filing a petition to end his marriage, said Commissioner Sir Harry Trusted in the Divorce Court.

He had built up a large business and did not wish to do anything reflecting on himself. But with nationalisation he was no longer susceptible to public opinion.—*From the "Evening Standard."*

The Magical South Western

"The advantages of this metropolitan station [Waterloo] have been very great, both to mere pleasure-seekers and men of business; and when about to undertake a journey on this most tempting and trustworthy of all the railways, it is felt to be something akin to magic to be wafted from the very heart of London to the verge of Southampton Water in less time than one could walk from here to Hampstead; or enabled to enjoy the enchanting scenery of Richmond and Hampton Court for an expenditure of the same sum that would be absorbed in the most moderate indulgence at a gloomy tavern in town."—*From Bradshaw's "Guide Through London," published in* 1851.

Railwayman's Cricketing Feat

An outstanding bowling feat by Fireman J. Pettit, of Northampton, London Midland Region, in a British Railways all-Region cricket championship final has earned for him the ball, suitably mounted, used in dismissing the Western Region in the final. The photograph reproduced below shows Mr. J. W. Watkins, Chief Regional Manager, London Midland Region, at a celebration dinner at Euston, with Mr. Pettit, whose bowling figures in the final which gained the Inter-Regional Cricket Championship for the London Midland Region, were 15 overs, 4 maidens, 19 runs, and 6 wickets.

Artist Names Station

The year (1860) the house near Lytham, built by the portrait painter, Richard Ansdell, was finished, a railway to Blackpool was considered and had reached Lytham. A wayside halt was named Ansdell Station, and it is said that Ansdell stipulated this when he allowed the line to adjoin his land. Certainly he strongly opposed the build- of a bridge over it. This was not done until 30 years later when the station was moved to its present position. Today it is Ansdell & Fairhaven, between Lytham and St. Annes.—*Alys Myers in a B.B.C. broadcast.*

Whistle Acknowledged

Mr. A. M. Beaton, Advertising & Publicity Superintendent of the Great Northern Railway Board, in an address to the Londonderry Rotary Club, on the early days of railways in Northern Ireland, explained that the G.N.R. was formed through amalgamation of four companies—the Ulster Railways, the Dublin & Drogheda, the Dublin & Belfast Junction, and the Irish North Western. Of these, the Ulster Railway was the oldest, opened for traffic between Belfast and Lisburn in 1839. This company early ran into trouble over its decision to run Sunday trains. One parson accused the company of "sending souls to the devil at 6d. a piece." "Every sound of the railway steam whistle," he fulminated, "is answered by a shout in Hell."

Mr. J. W. Watkins presenting mounted cricket ball to Mr. J. Pettit for his bowling for the London Midland Region in the British Railways cricket championship

Luxury on the New York Central

The "Twentieth Century" express from New York to Chicago is one example of the competitive spirit of free enterprise which is very much a reality in American life. An excellent cocktail, a haircut, the services of a stenographer, almost any magazine one wants to read, clean compartments, and a wide variety of foods on the menu are more than the English traveller has reason to expect on an overnight train journey anywhere.

On the table in the resturant car there is a brochure invitingly designed to provide a little light reading during the meal. The implication of this pamphlet is that the best way of passing a quiet twelve hours is to travel on this luxurious train. —*Mr. Michael Astor in "The Sunday Times."*

Capital Stuff

(*See editorial note in our November* 20 *issue*)

Addressing the Institute of T.,
The cheerful Chief of the L.T.E.
Has proudly claimed that, as railways go,
Ours are pretty good—well, he ought to know!
He even believed they might pay—some day—
If "refreshed" in the good, old-fashioned way.

When firms experience fortune's frowns
In private industry's ups and downs,
They jolly soon make up their minds to call
For a blood transfusion of capital.
Even Arthur Street couldn't tell you how
To extract much milk from a half-starved cow,
And the railways, poor camel-lious dears,
Have had to live on their fat for years.

If capital reinforcements turn
The fortunes of many a big concern,
Imagine the benefit they could be
To an impecunious chap, like me,
Whom the clutching hand of circumstance
May compel to flirt with the Treble Chance,
Or venture a vest on some quadruped
Which might just as well stay at home, in bed.

"Step up production! More! More!", they cry,
But the Oliver Twists of industry
Seem strangely loth to enlist the aid
Of gallant boys of the Old Brigade,
Who wouldn't waste time, you could safely bet,
In proving there's life in the old dogs yet;
Cash may be short, but we'd have enough,
For men, like money, are capital stuff!

A.B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

INDIA

Centenary Exhibition Attendance

Official figures show that over 811,000 people paid some £15,000 for admission to the Indian Railways Centenary Exhibition at New Delhi; this number does not include students, defence personnel, and railway employees admitted free on two days. Income from the stall rents, amusement park, refreshments and hoarding sites amounted to £33,750.

New Railway Hospital, Calcutta

The Eastern Railway has converted to a 60-bed railway hospital the official residence of the General Manager of the former Bengal-Nagpur Railway until last year. It is situated at Garden Reach on the Hughli opposite Southern Calcutta.

NEW ZEALAND

Rimutaka Tunnel

With 6,000 ft. driven, just under a quarter of the total distance of 28,864 ft. of the tunnel, the Featherston end of the Rimutaka Tunnel is 88 per cent complete. The face is now 500 ft. under the Pakuratahi Valley, where the existing line runs.

For the past few months the men have been working in rock which is easy to drill, and the distance driven a week has averaged 240 ft. Recently, a very hard rock encountered has slowed the drilling, bringing the weekly average down to 200 ft. There is little seepage at either face, and if present conditions continue, it is expected that the two faces will meet about April or May next. At the Mangaroa (Wellington) end 160 ft. in medium hard rock has been the recently weekly average. The distance in from this end is 9,500 ft.

VICTORIA

"S" Class Locomotive Scrapped

It was recently decided to scrap any of the "S" class 4-6-2 locomotives whose cylinders were worn badly enough to need replacement. No. 301, *Sir Thomas Mitchell,* is the first to be withdrawn from service and it is being scrapped at Newport Workshops. It had run more than 1,400,000 miles and, with the other three had helped to build up a combined mileage, at June 30, this year, of more than 5,700,000. All useable parts taken from the scrapped No. 301 will be stored and used, if necessary, on the remaining "S" class engines, while they remain in service. The "S" class locomotives were designed by Mr. A. E. Smith, Chief Mechanical Engineer from 1919 to 1928, and were rebuilt and streamlined in 1937 for hauling the "Spirit of Progress."

Multiple Operation of Railcars

A special fabricated type of coupler, designed by Victorian Railways' engineers, has been made at Newport Workshops to enable two 280 h.p. diesel railcars to run together. Later, it is intended to modify the control equipment of the railcars to enable multiple operation to be introduced. In the meantime, when traffic has warranted, two coupled 280 h.p. railcars have been run with two crews, on the Daylesford, Wangaratta, and Wonthaggi lines. Using railcars in pairs is clearly an economy in train running, particularly when the traffic offering has been too much for a single car and not enough for a steam train.

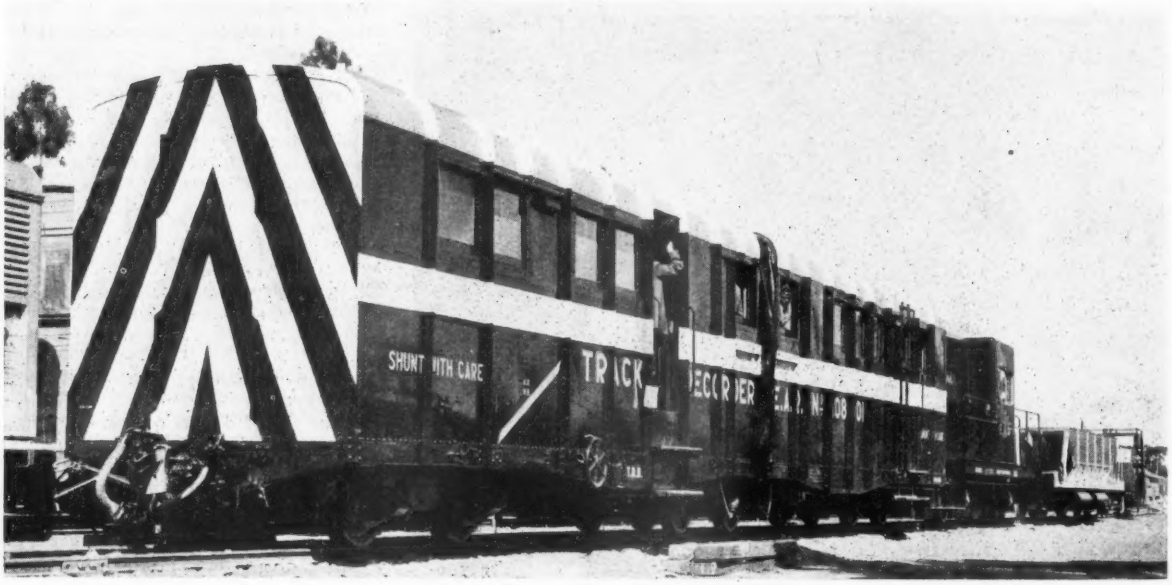
UNITED STATES

Kansas City—Dallas New Link

In our June 12 issue details were given of an application by the Atchison, Topeka & Santa Fe Railway to the Interstate Commerce Commission for authority to build a new 38-mile line which would shorten its main line from Kansas City to Dallas, Texas, by 30 miles. Improved access to Dallas is also being sought by the Louisiana & Arkansas Railroad, a subsidiary of the Kansas City Southern, which has applied to the I.C.C. for leave to build a 16½-mile line from Fox, Texas, to a junction with the K.C.S. at Blanchard, Louisiana, and for running powers from there over six miles of the K.C.S. into Shreveport.

This would make it possible for the L. & A. to abandon its present entry to Shreveport over 21 miles of Illinois Central trackage, and if the new line is authorised, the L. & A. will also seek authority to abandon 13¾ miles of its own existing line which makes connec-

E.A.R. Engineering Department Vehicles



Track recorder van and other special types of vehicles used by the Engineering Department of the East African Railways on display at Nairobi (see November 27 issue)

tion with the Illinois Central. The new cut-off will reduce the combined K.C.S.-L. & A. distance from Kansas City to Dallas, as well as that from New Orleans to Dallas. It may be added, however, that the Louisiana & Arkansas works freight traffic only over its Shreveport-Dallas line.

Restaurant Car with Open Kitchen

The New York, New Haven & Hartford Railroad has put into service a restaurant car in which all preparation and cooking of the food is in full view of passengers. The stainless steel kitchen, which forms the centre of the car, provides more healthy working conditions for the staff than an enclosed kitchen, and encourages cleanliness.

The all-electric equipment includes a high-speed cooking range, grill, oven, coffee-maker, refrigerator, and deep-freezer. The stainless steel pantry also is fully open to view. The layout provides for minimum movement by waiters between the kitchen, pantry, and customers; the latter are accommodated in one end of the car and at the other end there is a lounge for service of drinks. Interior decoration includes light blue walls for the body of the car, and bright yellow walls in the kitchen section.

CANADA

Toronto Underground

A two-car train ran over a completed section of the new Toronto rapid transit line on September 20, between Davisville Yard and Bloor Station. The rolling stock for the line, totalling 104 cars, is being supplied by the Gloucester Railway Carriage & Wagon Co. Ltd. Two cars formed part of a display at the Canadian National Exhibition in Toronto, seen by some 260,000 persons.

C.T.C. in Hamilton District

A new centralised traffic control scheme on the Toronto, Hamilton & Buffalo Railway includes the control of an existing interlocking area in Hamilton, Ontario, and of 39 miles of main line eastwards to Welland, where the railway connects with the New York Central on its route from Detroit through Ontario to Buffalo. The Toronto, Hamilton & Buffalo Railway operates over 16 miles of N.Y.C. metals between Welland and Buffalo.

ISRAEL

Railway Workshops Productivity

When the Israel Productivity Institute at the invitation of the Ministry of Transport investigated the State Railways' workshops, it was found that the system needed, for the distances travelled, an average of 1·6 locomotives overhauled a month, but the workshop was overhauling only one a month. Investigation showed that, with essentially the same equipment and manpower, the workshops could actually overhaul 2·4 locomotives a month.

To demonstrate the validity of these findings the staff appointed by the Institute selected for study the boiler shop, which had been found to be a bottleneck. By planning and scheduling the work in advance, providing convenient tool storage, and improving work methods, idle time and unnecessary work were eliminated. A system of payment by results was then introduced, and in the first month productivity increased by 30 per cent, and is still rising. Having demonstrated the possibilities, the Institute recommended that the workshops use the services of consulting production engineers and train selected members of its own staff to continue the work in other departments. These recommendations are being followed.

ITALY

A Direct Venice-Munich Line

The State Railways are understood to be reconsidering the project, which dates from 1925, for a direct line from Venice to Munich, via Conegliano, Dobiacco, Ahrntal, Rattenberg (Tyrol), and Kufstein, 244 miles, compared with the 354 miles against the present route via Verona and the Brenner. On Italian territory alone more than 60 miles of line would have to be constructed in tunnel. The highest point of the new line would be situated about 3,000 ft. above sea level. The total cost of construction would be lire 125 billion.

SWITZERLAND

Waldenburg Line Electrified

Electric traction has been introduced on the 8-mile narrow-gauge railway branching at Liestal from the Basle-Olten main line and leading south to Waldenburg. This line, built in 1880 and belonging to the Waldenburg Railway Company, is the only railway in Switzerland with the gauge of 2 ft. 5½ in. It was originally 7¼ miles long but a realignment carried out in 1923 to connect the railway at Liestal with the Federal Railways station increased the length to 8½ miles.

FRANCE

Anti-Shock Frame

La Cie. Nouvelle de Cadres, a subsidiary of the S.N.C.F., established in 1948 by S.C.E.T.A. for the development and operation of containers, has been given the right to operate a mobile form of anti-shock frame which can be fitted on certain types of well or flat wagon. The use of this frame has helped in reducing considerably the damage to fragile plant of high value such as electric transformers, rotors, and aircraft equipment.

The apparatus comprises a base portion in the shape of a very open W; the inner uprights of the W form a runway, and the outer uprights form two horizontal sliding grooved braked bars. This base portion is fixed to the floor of the wagon and there is also a mobile platform fitted with four rollers in contact with the runway. At each side of the mobile platform are two leaf springs secured to metal bars which are in contact with the grooved bars and act as skid brakes.

The load is secured to the mobile platform and vertical shocks in transit are damped by the weight of the load and platform, and absorbed by the springs; the effect of horizontal shocks due to a sudden change of speed is minimised by the skid braking. The W-shaped base portion is fitted with rings to facilitate lifting by crane from the railway wagon to a lorry, or vice-versa. The maximum permissible load on the anti-shock frame is ten *tonnes*; the apparatus has a tare weight of two *tonnes*.

Training of Apprentices

The S.N.C.F. has made considerable improvements to a small apprentice-training workshop at Brive Locomotive Depot. This depot is responsible for repairs to and maintenance of three classes of electric locomotives, and to give the apprentices the opportunity for practical training; certain repair work is carried out in their workshop.

The workshop includes two pits served by a turntable; one pit is concerned with work on bogies and the other with that on bodies. Equipment includes four electrically operated 25-*tonne* jacks and an electric crane for heavy lifts.

Repairs to mechanical and electrical parts are carried out on three benches, each equipped with three vices, and there are two test benches. Office accommodation is provided for instructors who have found this practical workshop of considerable value in the training programme.

IRELAND

New G.N.R. Excursions

To encourage more travel during the "off" season the Great Northern Railway Board is experimenting with cheap day excursions between Belfast and Dublin. The return fare (in either direction) is 15s., the lowest offered since before the war.

Two such excursions have already been run from Belfast. On the second, 350 passengers travelled from Belfast at 9.25 a.m. and returned from Dublin at 6.15 p.m. The first excursion train from Dublin to Belfast by diesel train was on November 12, when 120 people took advantage of the cheap fare. These excursion trains are non-stop.

Before the war the G.N.R. ran afternoon excursions to Belfast at a fare of 7s. 6d. return. At present the ordinary day excursion return fare is 22s. 6d. The ordinary three-month return ticket costs 34s. 1d.

Rubber Suspension for Bogies

Experiments by London Transport with the suspension of bogies on rubber to reduce maintenance costs

EXPERIMENTS are now being carried out by the Development Division of the department of the Chief Mechanical Engineer (Railways), London Transport with various types of rubber suspension for bogies of both tube and surface line cars. The object of these experiments is to determine the practicability of suspending the whole bogie on rubber, and so bring about a reduction in maintenance costs by eliminating all wearing parts such as rubbing plates, hanger pins, and bushes, as well as the steel springs. It is felt that such suspension would also go a long way towards reducing, if not eliminating, the running noises resulting from conventional type bogie suspension, particularly in tunnels.

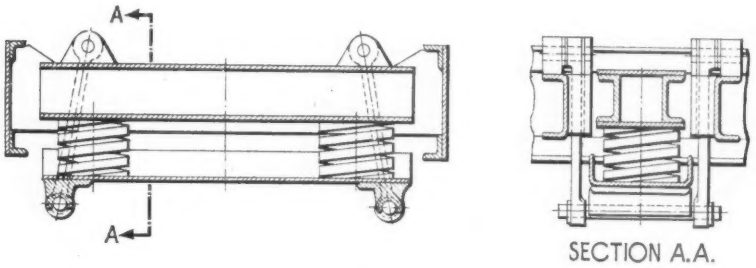


Fig. 1—Standard arrangement of bolster suspension; the hangers are inclined at 8 deg.

Bolster Suspension

The first experiment concerns bolster suspension. The standard arrangement, shown in Fig. 1, consists of a spring plank hung by means of four hangers, two at each end. The upper ends of the hangers are connected to the bogie side frame and the lower ends to the spring plank which carries helical springs at each end for supporting the car body through the centre pivot. To stabilise the car body for side oscillation, the hangers are inclined 8 deg. from the vertical.

The experimental rubber-suspended bolster takes the form of two rubber packs at each end of the bolster, as in Fig. 2. By inclining the rubber packs inwards from the top towards the centre of the bogie, and outwards at the bottom longitudinally, it is possible to cater in one arrangement for all the loads taken by the bolster, i.e., the vertical load from the car body plus passenger weight, the longitudinal loads from traction and braking, and the transverse loads from side oscillations. With this arrangement, rubber is used in shear as well as compression.

A District Line trailer car, fitted with this type of suspension, was put into passenger service in October, 1947, and has run satisfactorily for the past six years. An alternative design of bolster was produced, with the rubber packs located outside the bogie frame, the car body being mounted directly on the rubber through vertical struts (shown in Fig. 3). This method of suspension eliminates the usual form of bogie centre pivot bearing, as the weight of the car body is carried on the struts which, being inclined, provide a restoring force when they are moved out of centre by the swing of the bogie on curves.

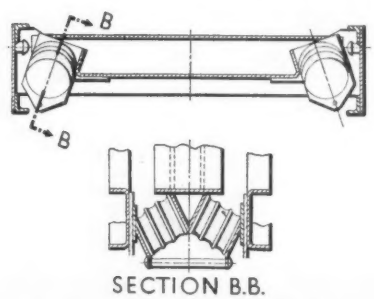


Fig. 2—Rubber suspended bolster; the packs are inclined upwards towards the centre of the bogie

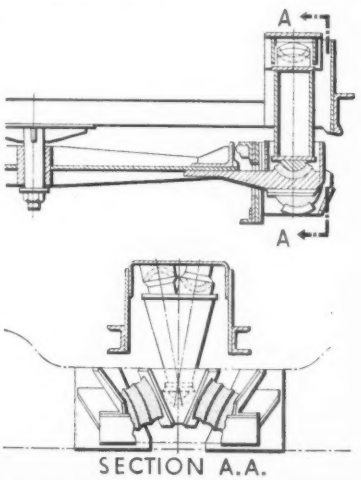


Fig. 3—Alternative design of bolster in which the rubber packs are located outside the bogie frame

When this type of bolster suspension is applied to a tube stock bogie, it is not possible to provide the usual shoe-beam arrangement for carrying the collector gear, and it is therefore necessary to mount the gear on the bogie frame and provide a compensating device to allow for bogie deflection. This design was tried out on a trailer car on the Piccadilly Line but, under certain conditions of track and curvature, the riding qualities were found to be inferior to the previous arrangement, and the design was withdrawn.

Axlebox Suspension

Attention has also been given to axlebox suspension, as it is considered that suitable design of rubber suspension, used in conjunction with a suitable bolster design, would result in the complete bogie being rubber suspended, and all the present suspension wearing parts eliminated.

The standard system of suspension is shown in Fig. 4. The axlebox is carried in hornguides, both hornguides and the sides of the axlebox being fitted with manganese liners. The axlebox supports the bogie by a laminated spring carried off the bogie side frame through auxiliary springs and hangers. The centre of the spring sits on top of the axlebox, the buckle of the spring fitting into a suitable recess in the top of the axlebox. Wheel wear is allowed for by adjustment of the nuts on the auxiliary spring hangers.

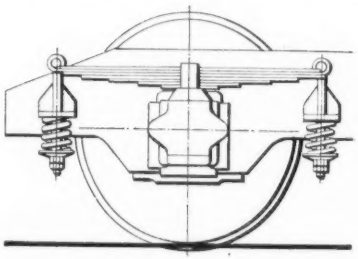


Fig. 4—Standard system of suspension in which the sides of the axlebox are fitted with manganese liners

Several designs of rubber axlebox suspension were considered but found to be impracticable, partly due to the high cost, but mainly due to the size of the rubber unit necessary to carry the loads concerned. In conjunction with Metalastik Limited, a design was evolved using chevron rubbers, i.e., vee-section rubbers bonded to suitably shaped plates. This design, being compact, can be located in line with the centre of the axlebox bearing in a very simple manner (seen in Fig. 5).

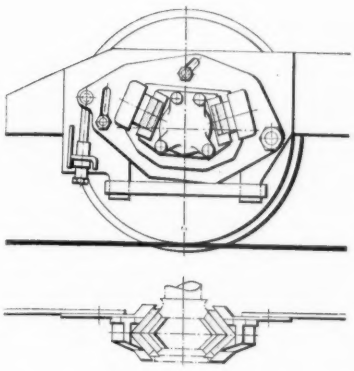


Fig. 5—Chevron rubbers bonded to steel plates located in line with the centre of the axlebox

The whole of the axlebox, complete with the chevron mountings, is placed in a yoke casting bolted to the bogie side frame. To allow for adjustment for wheel wear, the yoke is pivoted at one side and bolted through slots at the top and opposite side. A screw adjustment is provided so that the yoke, when slacked off from the bogie frame, may be raised or lowered.

With this design the side frame deflection was limited to ½ in., as it was considered that to give a greater deflection would have complicated the design, and in any case the bolster rubbers could, if required, be given increased deflection to compensate for the reduced deflection of the side frame. Following experimental test running, a car set of this design was fitted to a pre-1938 tube stock trailer car, which had already been fitted with the rubber bolster shown in Fig. 2, for service trials.

Rail Joint Vibration

The test showed that this type of axlebox suspension behaved very satisfactorily, vibrations due to rail joints being noticeably damped out. In the normal way, with the standard form of laminated spring suspension, the spring cannot respond quickly enough to absorb rail joint vibration. This type of axlebox assembly, therefore, greatly reduces the dead load impacts on the bearings as well as on the axle. It is also considered that the high-frequency vibration to which the axle is at present subjected, due to the greater rigidity of roller bearings, now standard on London Transport rolling stock axleboxes, will be damped out. It has been suggested that these high-frequency vibrations may be responsible for incipient fractures of axles.

From these experiments and trials, it it considered that the best arrangement is the design of bolster shown in Fig. 2 together with the chevron axlebox suspension shown in Fig. 5. A further set of these axlebox suspensions has now been fitted to a District Line car so that both axlebox and bolster suspension are on one surface line car, now in passenger service for extended running tests.

While an accurate appreciation of the financial aspects of these assemblies has yet to be made, depending on the life of the rubber units, a preliminary investigation at a time when price levels were high indicated that the cost per bogie was approximately £50 more than for the standard arrangement. Based on the past six years' experience with bolster rubbers, it is anticipated that the life of the rubber units will be approximately ten years, if not longer, and on this assumption the saving in maintenance would more than compensate for the extra initial cost.

Market Stations in France

Schemes drawn up for Paris and provincial towns

WIDESPREAD interest in market stations for the collection and distribution of horticultural and agricultural produce has been aroused in France by the French Government's support of the plan as tending to reduce high prices. One of the decrees, which the government was authorised to issue during the parliamentary recess, aimed at abolishing the "free" market connected with Les Halles, the markets in the centre of Paris and at the same time favouring the formation of markets of "national interest."

Hitherto the sales have taken place in the streets and on the pavements and speculators have unduly raised prices in the existing confusion. Some 3,000 lorries bring in supplies daily and take them out again to retailers in Paris, the suburbs and adjoining towns. If a market were organised at a railway station on the outskirts of Paris, it is estimated that 300 lorries would be sufficient to supply all retail shops.

Further, by transporting produce direct from arrival platforms at the railway station market to adjoining districts there would be a gain of about 24 hours and no need to pass through Paris. The improved organisation would also end the present highly congested condition of Les Halles and the neighbouring streets. Improvements would also include better packing so that packages could be sold by auction on sight of samples, as well as mechanical equipment, palletisation and other labour saving methods.

Such methods are applicable to other towns in France. Last year under the Monnet Plan for Modernisation & Equipment a market stations commission was formed to consider financial means of aiding municipalities, chambers of commerce and companies to organise in France market stations supplied directly by rail and road. A first credit grant of about £1,000,000 for this purpose was provided in the second Monnet Plan.

Three different types of market stations were studied: dispatching, transit, and distributing. Avignon was selected as a dispatching station with estimated equipment costs of fr. 750,000,000; Marseilles, as transit, with port equipment of 1,200 million, and as distributing market stations Lyons (estimated cost 1,500 million); Toulouse and Strasbourg (800 million each). Other projects in view concern Paris, Lille, Metz and Perpignan. Later, Bordeaux, Nantes, Rouen and Rennes may be organised as distributing market stations.

Plans for equipment of such stations have been drawn up, and that for Lyons is in an advanced stage. Preparations for equipping a market station in the Paris area have encountered local opposition.

In Lyons the planned station market will cater for wholesale dealings in produce, mainly fruit and vegetables, now carried out under defective conditions in four different localities. There will be direct rail and road access to the market, which will cover an area of 15,000 sq. m. adjoining Lyon-Perrache station.

The population served in Lyons and suburbs numbers about 800,000; but within a radius of 30 miles the number is more than a million. The produce comes from adjoining districts and also from the Rhone Valley, as well as from North Africa and foreign countries imported through Mediterranean ports. Wholesale dealers distribute the produce to the principal towns in adjoining departments and to resorts in the French Alps, while some is exported to Central Europe.

Railway and road platforms will be provided for unloading and dispatching supplies, as well as grouping the lots ready for sale. The market will include one-way roads 50 to 90 ft. wide. Parking of cars will be permitted at a platform which may be transformed, if required, for unloading produce. Dealers' stores, where produce is unloaded, will have floors level with those of wagons and lorries. Mechanical devices, small lorries and cranes will be run on the platforms to aid in transporting produce. Refrigerating stores will be available. Auction sales will be conducted as far as possible by means of samples. To save labour in handling, palletisation will be adopted.

Half-Through-Type Bridge with Precast Prestressed Concrete Deck

Design developed on the Western Region and already carried out in four structures

A DESCRIPTION of a half-through-type underline bridge with prefabricated deck units of steel beams and reinforced concrete bolted to welded mild steel main girders, appeared in our August 22, 1952, issue. The design had been prepared with the object of reducing the amount of site work during erection and at the same time producing a span requiring the minimum of maintenance in the future. The use of prefabricated prestressed concrete for the deck units is an important step forward towards this goal. The large units have cut down the number of crane-lifts required during erection; the uniformity of the units has simplified fabrication; and the need for overall waterproofing—costly and involving extended occupations for laying—has been eliminated by the use of concrete which, being under compression under all conditions of loading, is virtually crack-proof. Four bridges of this new design have recently been brought into use on the Western Region.

Constructional Details

The details of construction are shown in one of the accompanying diagrams. The decking consists solely of precast prestressed concrete slab units, 10 in. thick and about 6 ft. in width, spanning between the inclined faces of the stiffeners on the main girders. The ends of the units (adjacent to the main girders) are bounded with mild steel channels strengthened with thick plates welded to the channel webs and forming the anchorages against which the nuts on the Lee McCall prestressing bars bear. Short lengths of angles welded to the ends of the channels bear against the sloping flanges of the tee-section stiffeners on the girders. During erection each unit is lowered down between the girders until shear plates welded on the contact face of the angles land on similar shear plates welded to the stiffeners, the connections being completed with high strength bolts tightened to a predetermined torque and tensioned to within 85 per cent of the yield point. The shear plates are designed to carry the end reaction, and the bolts—the shanks of which are not machined and have a tolerance of $\frac{1}{8}$ in. in the holes—are designed to carry the bending stresses developed by the end fixing moments. Each joint is self-contained and there is no longitudinal post-tensioning of the deck after erection.

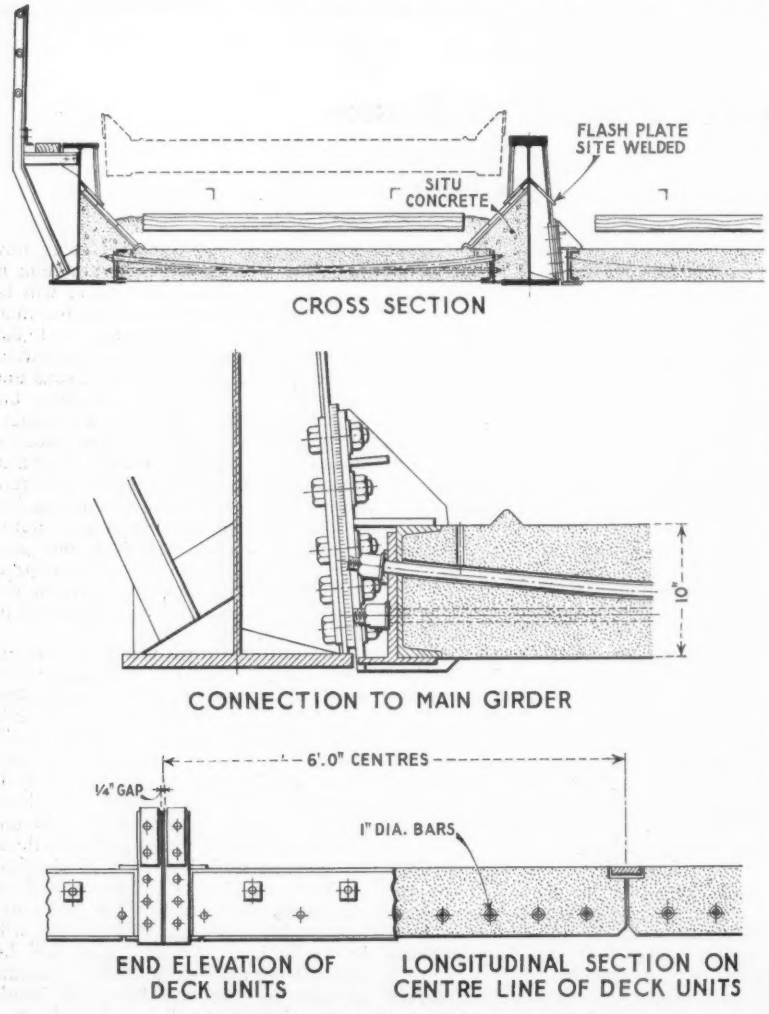


Diagram showing details of construction

In the first two bridges built to this design and situated near Great Malvern, the space between the units and the girders was filled with situ-poured concrete haunched up against the web plates and protected with waterproofing membrane tucked under drip-plates welded on the girders and overlaid with tiles. In later bridges, however, near Ide in Devon and on the main line just south of Snow Hill Station, Birmingham, the ballast is contained within removable steel ballast plates, and the space between these plates and the webs of the girders is covered over with sloping weather-boarding of either timber or steel.

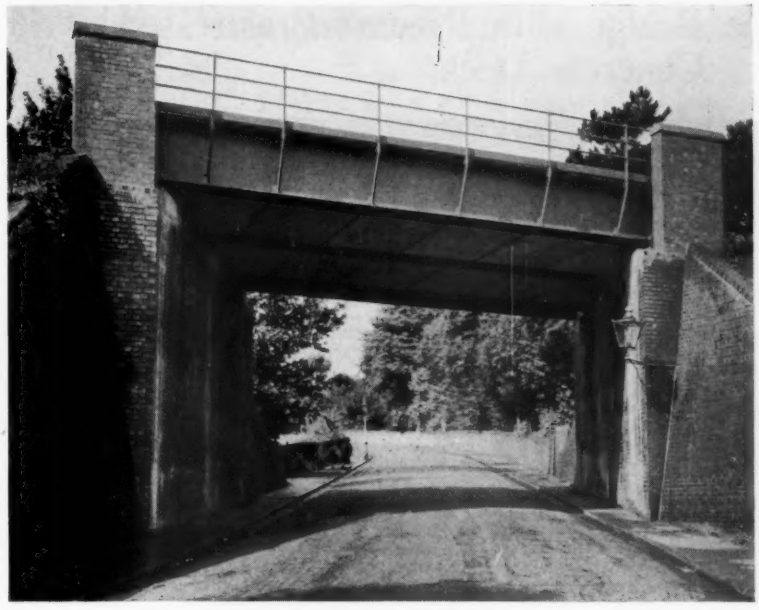
The joints between the units are rendered watertight by strips of waterproofing membrane laid in recesses formed along the adjoining edges of the units during casting and protected with concrete tiles set in hot-poured Pliastic. With 6 in. of ballast under the sleepers, the relatively shallow construction depth of some 28 in. is obtained.

Design for Three-girder Bridges

In double-track bridges with three main girders, special attention has been paid to the end fixing moments induced by the rigid connections between the decking and the main girders. The end moments have been calculated on the assumption of full fixity at the centre girder; but as the structure cannot be perfectly rigid in a transverse direction, the actual end moments are likely to be of smaller amount than those calculated. The permissible compressive stress in the concrete is 2,500 lb. per sq. in.

Fabrication

In making the units, the steelwork forming the anchorages (and incidentally the end shuttering), completely fabricated before the concrete is cast, is



Bridge near Great Malvern

secured to a mild steel jig so as to ensure that every unit in the bridge is made to exactly the same width with the connecting angles (to the stiffeners) set to the same slope. Steel shuttering is used under the units and along the sides.

After the cage of mild-steel reinforcement has been placed in position, rubber ductubes are threaded through wire loops incorporated in the cage and inflated with air to a pressure of about 30 lb. per sq. in. The mix for the concrete consists of 2½ cu. ft. of Portland cement, 4 cu. ft. of sand and 7½ cu. ft. of aggregate. The water/cement ratio is 0·4. Internal vibrators are used during the pouring of the concrete. Seven days after casting the ductubes are deflated and withdrawn. The prestressing bars are then inserted and the nuts at each end are tightened with a spanner to secure the end channels against any risk of displacement when the shuttering and jig are removed.

The specified minimum strength of the concrete is 4,800 lb. per sq. in. after three days, and 7,500 lb. per sq. in. after 28 days. Tests on 4-in. cubes have shown consistently high strength, the actual 28-day breaking strength being between 8,500 and 9,000 lb. per sq. in. Four weeks after casting the concrete is prestressed; the bars are tensioned in pairs with two Lee McCall jacks. In units having an odd number of bars, the central single bar is left to the end. The maximum hogging measured at the centre of a unit caused by the prestressing bars is less than $\frac{1}{20}$ in.

Exact Fit Ensured

A high degree of accuracy is required in the fit between the angles on the deck units and the stiffeners on the girders to meet the obvious requirements that the main girders shall be plumb vertical after the connections have been bolted up. In fabricating the main girders, the fillet welds between the flange plates and the web plates are completed in a Fusarc automatic welding machine before the stiffeners are fitted to the girders. To ensure that the stiffeners shall be set to the correct outstand and slope, they are bolted to the deck units before being offered against the webs of the girders to which they are "shaped" and tack-welded. The bolts are then removed and the main girders drawn away from the units for the completion of the welding of the stiffeners to the webs. To meet this sequence of operations and to enable the whole span to be assembled and proved before acceptance for delivery to site for erection, it is obviously desirable that the concrete units shall have been made in the same works as that in which the girders are fabricated.

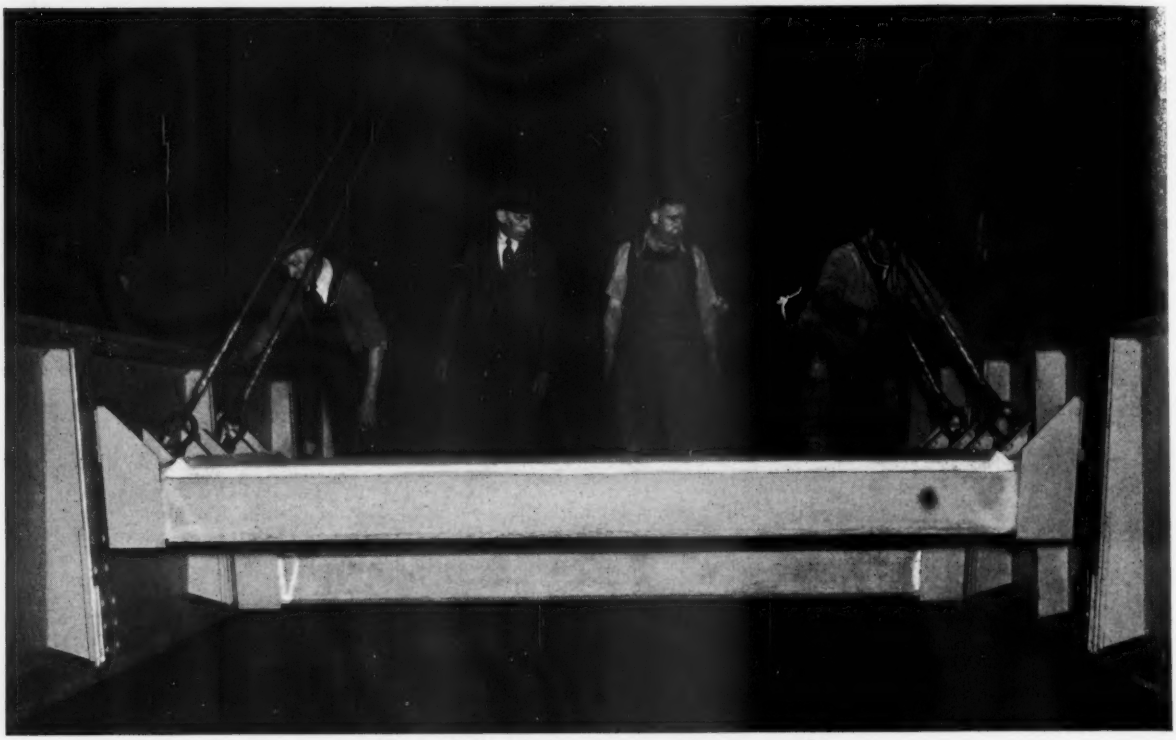
Tests Applied

Tests were carried out on the first bridge—a double track span of 27 ft.—both in the makers' works and on site after erection. After assembly at the works, temporary steel girders placed transversely across the span clear of the tops of the main girders and anchored to straps passing under the bottom flanges, enabled the full design load to be applied by hydraulic jacks pressing down on longitudinal timbers resting on rubber mats and distributing the load uniformly over the units. Electric strain gauges on the top and bottom surfaces of four of the units were used to record the changes of stress in the concrete. Readings taken with the test load applied on the units under one "track" only and on both "tracks" simultaneously gave results confirming the correctness of the design calculations. Further confirmation was obtained from readings taken on site when two "Castle"-class engines, one on each track, were used for the tests.

The bridges were built to the requirements of Mr. M. G. R. Smith, M.B.E., Civil Engineer, Western Region, in whose office the designs were prepared. The whole of the superstructures have been fabricated and the deck units cast and prestressed by the Fairfield Shipbuilding & Engineering Co. Ltd. at Chepstow. The recording of the stresses during tests was undertaken by the staff of the Superintendent of the Research Department of British Railways at Derby.

The end of a deck unit held in the steel jig. The inflated ductubes and reinforcement are in position ready for the concrete to be poured

Half-Through-Type Bridge with Precast Prestressed Concrete Deck



Lowering a deck unit down between the main girders

Placing the deck units in position during the erection of the bridge over Park Street, Birmingham. The fourth unit is about to be landed on the shear plates

New Reclamation Plant for Canadian Pacific Railway

Provision of new diesel oil from old at a saving of more than half purchase price

IT is popularly supposed that, after a period of use, lubricating oil "breaks down." This is not so. Contamination from the products of internal combustion engines, excessive fuel dilution, water in the crankcase, mechanical failure causing material contamination and loss of chemical constituents cause the oil to lose its "heavy duty" qualities. This condition results in a rapid rate of oxidation and the loss of dispersive characteristics.

Although the process of oil reclamation is not new—a plant exists in this country for the purpose of renewing oil used in the shipping industry—the plant recently built by the Canadian Pacific Railway at the St. Luc Freight Terminal, Montreal, is the first to operate on a full scale in that country. The plant, which was recently inspected by Mr. N. R. Crump, Vice-President of the Canadian Pacific Railway, represents an outlay of $150,000. Its purpose is to restore lubricating oil for the company's fleet of diesel locomotives.

The refinery is housed in a one-storey building of 40 ft. by 50 ft. The re-refining equipment and laboratory are situated above ground, storage tanks for new and used oil being accommodated in the basement. The plant was designed with future diesel expansion in mind: not only capable of handling all the oil reclamation at present required by the company, it can expand its production to meet any future demands.

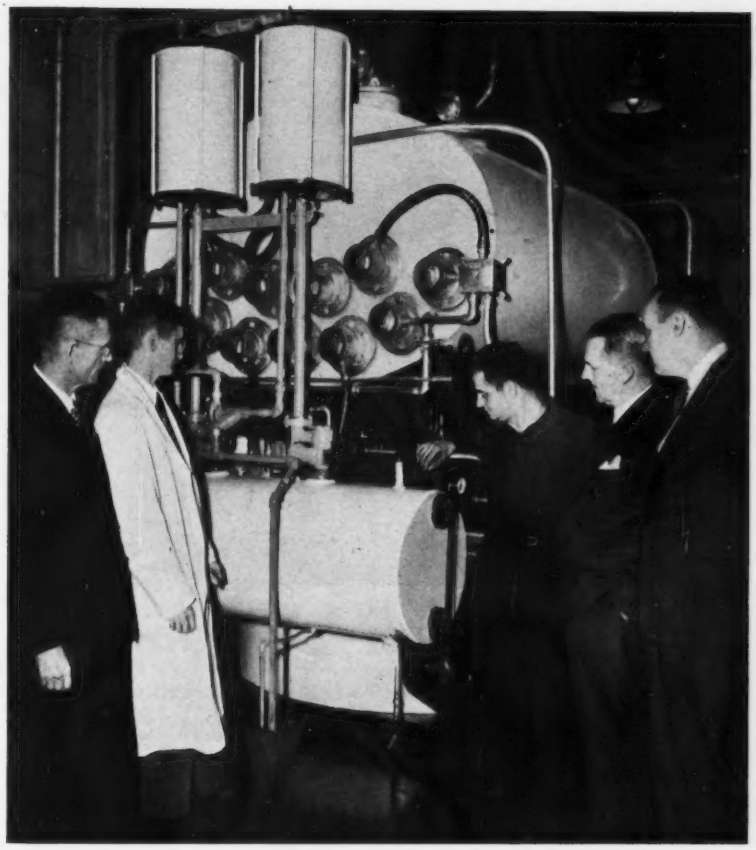
The basis of the whole treatment is the principle of cleansing crank-case oil which has become contaminated after use in lubricating diesel locomotive engines. The oil, which is collected from diesel depots throughout the Canadian Pacific Railway system, is processed in quantities of 375 gal. at a time, the operation comprising a total day's production of eight hours. The equipment is geared to turn out three times as much restored oil in a double eight-hour shift. The finished product turned out by this plant is in brand-new condition and may be used for lubrication immediately.

Equipment at the plant includes an open mixing tank, electrically heated retort, vacuum pump, condenser, and dilution tank. Storage tanks, as previously stated, are provided for used and recovered oil.

The first stage in reclamation involves the mixture of the unserviceable oil with activated clay, the latter acting as a blotter in removing many of the insoluble impurities. The mixture then passes to the retort, where it is heated under vacuum to a temperature of 600 deg. F. This second stage results in the removal by distillation of the more highly volatile impurities such as water and fuel oil. "Steam stripping," through the introduction of high pressure steam to the retort, then takes place, the product thereafter being dropped into the contact tank, where it is kept under agitation. Remaining impurities are removed by pumping the partially treated oil through the filter press.

The reclaimed lubricant is tested by laboratory methods to determine its fitness, and, after approval, it is heated to approximately 175 deg. F. A predetermined amount of additive or chemical which gives lubricating oil its "heavy duty" properties is then pumped into the tank and the mixture is thoroughly agitated.

The cost of a gallon of oil so reclaimed is between 25 and 30 cents compared with 65 cents per gal. for new oil.



Part of the equipment in the C.P.R. reclamation plant being inspected by (left to right): Mr. F. A. Benger, Chief of Motive Power & Rolling Stock for the railway, Mr. A. B. Cockshott, Chemical Engineer in charge of the plant, Mr. George Sinclair, Plant Operator, Mr. N. R. Crump, Vice-President of the C.P.R., and Mr. J. W. Ussher, Engineer of Lubrication & Water Treatment

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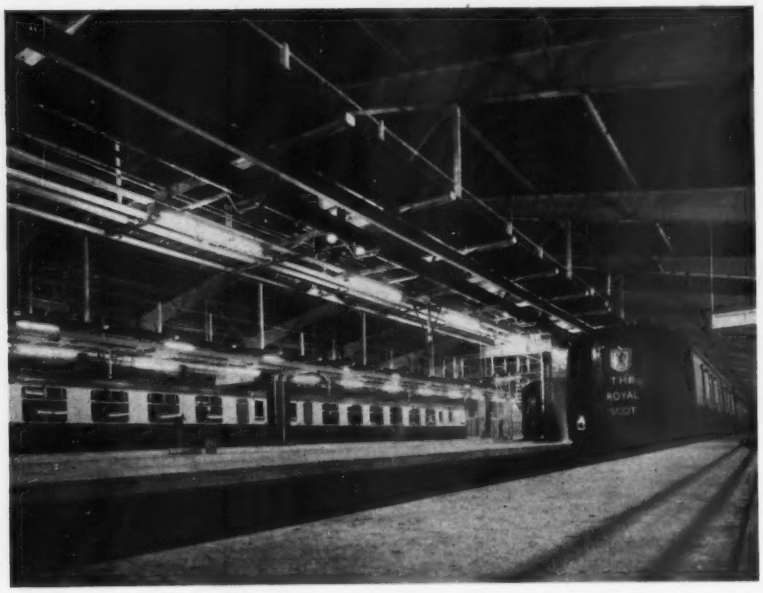
SILICONE RUBBER IN INDUSTRY.—An exhibition of Silastomer silicone rubber to illustrate the diverse fields of its application in industry was opened by Lord Perth, Chairman of the Dow Corning Corporation, of America, at 19, Brook Street, London, W.1, on December 1, under the auspices of Midland Silicones Limited. Silicone is the first synthetic rubber to be manufactured on a commercial scale in this country. Silastomer silicone rubber combines the heat stability and moisture resistance of resinous silicones with the physical properties of rubber, including resilience, shock and abrasive resistance to both mechanical and electrical fatigue. The surface resistivity of Silastomer is stated to be high, and its thermal conductivity to be about twice as great as that of either organic rubber or resinous insulating materials. The material is distributed in Great Britain by Midland Silicones Limited, an associate of Albright & Wilson Limited, Barry, South Wales. The exhibition will remain open until December 10.

Lighting at Willesden Carriage Shed, L.M.R.

Three types of light sources used in specially designed fittings



Illumination at platform level in shed provided by fluorescent lamps in Metrovick fittings on side walls and under walkways

CONSIDERABLE attention was paid to planning the lighting of the new carriage shed at Willesden, L.M.R., to ensure comfortable and safe working conditions for the staff employed there during the night hours. The interior lighting scheme was devised by the railway's engineers and the fittings were designed and built to the special requirements of British Railways. Work in the shed includes cleaning and mechanical inspection of coaches.

Some 430 fluorescent units were supplied by the Metropolitan-Vickers Electrical Co. Ltd. They consist of a heavy-gauge channel containing the lamp operating gear, which is fixed on a backplate. The channel is hinged from the backplate for easy wiring and in the closed position the fittings are drip-proof. All metal parts are heavily cadmium plated apart from the sheet steel, which is vitreous enamelled white.

Types of Fittings

Two main types of fittings have been used. One type consists of two-channel fittings, for 5 ft., 80 W. daylight lamps, with angle reflectors. These are mounted on the walls at the eaves 18 ft. above ground level, 20 ft. apart. The second type are simple channel fittings for either one or two 5 ft. 80 W. daylight lamps which are mounted 13 ft. above ground level below the elevated walkways in the shed.

A high value of illumination is essential on the vertical plane and the following figures give some of the values which have been obtained in service:—

Lighting mainly from angle fittings
Vertical illumination on side of coach : 5-6 lumens per sq. ft.
Horizontal illumination at deck : 5-6 lumens per sq. ft.
Lighting mainly from single-lamp channel fittings
Vertical illumination on side of coach : 6-10 lumens per sq. ft.
Horizontal illumination on deck : 7-9 lumens per sq. ft.

The main illumination for the central portion of the shed interior comes from 24 fittings designed in conjunction with British Railways engineers and manufactured by the General Electric Co. Ltd. Each fitting incorporates one 250 W. mercury lamp, one 500 W. tungsten lamp and two 5 ft. 80 W. daylight fluorescent tubes.

An acceptable quality of general lighting is provided by the combination of mercury and tungsten, while the fluorescent tubes on the sides of the fittings illuminate the walkways from which there is access to the roofs of carriages in the sheds. Raising and lowering gear enables the fittings to be inspected and lamps changed at ground level.

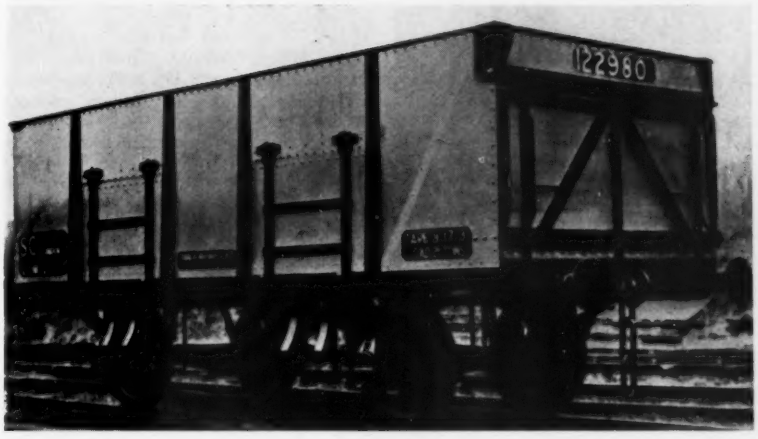
The foregoing schemes for illumination at floor level and on the walkways are supported by the fluorescent lighting in the inspection pits, for which the fittings, described in our March 13 issue, were supplied by Falk, Stadelmann & Co. Ltd.

Mercury, tungsten, and fluorescent lighting combined in G.E.C. fittings mounted in roof to light central portion of shed and walkways

RAILWAY BENEVOLENT INSTITUTION CASUALTY FUND, 1954.—The usual New Year's Day collection in aid of the Railway Benevolent Institution will be made on January 1, 1954, at all railway stations in Great Britain and Ireland. The number of employees who became members of this year's casualty fund was 204,214 and assistance has been rendered to 80 widows of men killed, 500 widows of men dying from illness, and 3,048 men accidentally injured, making a total of 3,628 or one in every 56 contributors. It is hoped that the travelling public will generously augment the contributions made by railwaymen.

Aluminium Wagon in Service

Absence of corrosion after seven years' service in arduous conditions



British Railways mineral wagon of 21 tons capacity fitted experimentally with aluminium plating in 1945

ALTHOUGH in the transport field the advantages of aluminium as a constructional material are most obvious, its adoption for railway rolling stock, has so far been on a comparatively small scale in this country. The main reason is, that although in principle the desirability of reducing the tare of goods wagons is unquestioned, it is not easy in practice to prove immediate benefit from doing so. Lighter stock does not automatically permit longer trains, because it may not be possible to accommodate them on the loops and sidings of the existing system; the principal saving shown will be in reduced fuel consumption, which will become apparent only when lighter stock is used in quantity.

Lightness, however, is not the only asset that aluminium has to offer the railway engineer, and this is well illustrated by the history of a 21-ton mineral wagon that was experimentally plated with aluminium in 1945. At that time, when many coal producers owned their own wagons, the railway companies were charging a lower haulage rate for coal carried in large (21-ton) wagons, owing to their better gross/tare ratio There was thus an incentive to improve the efficiency of these wagons still more in order to be able to press for a further reduction in the haulage rate.

Aluminium Plated Wagon

The Cambrian Wagon Works Limited, Cardiff, contemplated the building of a prototype all-aluminium mineral wagon, and Northern Aluminium Co. Ltd. were asked to give their recommendations as to choice of alloys and thickness. The builders finally decided to use aluminium for the plating only (in the same thicknesses—$\frac{3}{16}$ in. for sides and $\frac{1}{4}$ in. for floor—as the normal steel plate), retaining a steel frame and hot-driven steel rivets. Tare was then 8 tons 17 cwt. 3 qrs. compared with 10 tons, 3 cwt. for all-steel construction. The unpainted wagon was put into service with a private owner, carrying coal and coke.

The demand for lighter wagons did not materialise, and after nationalisation all privately-owned stock was purchased by the Railway Executive. The prototype wagon, however, remained in service and has on three occasions been examined to discover the behaviour of the aluminium in the extremely arduous conditions. From the last of these inspections, made jointly in January 1953 by the Railway Executive, Aluminium Development Association and Aluminium Laboratories Limited (on behalf of Northern Aluminium Co. Ltd.), it was evident that, even if weight-saving were completely discounted, aluminium was an excellent material for the job on the grounds of durability alone.

Conditions from the corrosion point of view were severe. In composite structures of aluminium and steel, unless thorough protective treatment is given, there is always a possibility of galvanic interaction at bi-metallic joints in damp surroundings. In this wagon it was possible to apply paint between mating surfaces during construction, but any protective paint applied to rivet heads and other exposed surfaces would quickly have been abraded away. Various niches and crevices in the body were filled with damp coal dust, giving very unfavourable "poultice" conditions. A large part of the wagon's life had certainly been spent in more or less polluted atmospheres.

Condition after Seven Years' Service

Nevertheless, the recent examination showed the plating to be in a sound and serviceable condition after seven years' work. There was an adherent deposit on the metal which, when removed, showed that general surface attack, indicated by a whitish deposit, was very slight. It was most marked on the underside of the floor and at the lower edges of the sides, where moisture would tend to persist, and adjacent to steel members. Localised corrosion

Condition of the interior after a service of seven years

had taken place only in a few isolated instances where dust and moisture had been trapped between steel angles and the plating, and at the side of one rivet head. The edges of the plates were still sharp-cornered and uncorroded.

Minor mechanical damage—dents, abrasions and two small punctures—was apparent (coal is normally dropped into the wagons from hoppers through a distance of six feet), though the high energy-absorbing capacity of aluminium would enable it to stand up to such impact loading rather better than steel of similar strength. The general condition of the wagon contrasted very favourably with that of steel wagons of similar age in the same service. It is normal practice to paint the outside of steel wagons every five years, and after seven to ten years the lower part of the sides usually needs repair or replacement. It seems evident that the unpainted prototype aluminium wagon should give years more service before needing serious repair.

The cost of replating the sides and floor of a Railway Executive 16-ton wagon with $\frac{3}{16}$ in. and $\frac{1}{4}$ in. aluminium respectively is approximately £60; after the first normal repair period for a steel wagon has elapsed, the repair charge and revenue saved may largely offset the extra initial expenditure. The higher utilisation and longer life expected would tend to reduce the total number of wagons required and the annual building programme. Eventually, too, the weight saving on each wagon would show its effect on fuel consumption, but meanwhile, the benefits of longer life and reduced maintenance, demonstrated by the prototype wagon, may accrue within a relatively short time.

Battery-Operated Water Tanker Trucks for British Railways

Capable of carrying 275 gal. of water on battery electric chassis

Battery operated water tank of 275 gallons capacity manufactured by Steels Engineering Products Limited in service on British Railways

THE first of a fleet of battery-operated electric water-tanker trucks designed and built by Steels Engineering Products Limited, Sunderland, are now going into service with British Railways. Based on the electric Eel truck design, they will be used to replenish the water tanks of long-distance passenger rolling stock. Each truck has a four-wheel chassis built round a fabricated frame of electrically welded pressed-steel sections and of considerable strength. The driving axle, composed of rolled-steel sections and employing reversed Elliot type stub axles, is fitted with independently motorised wheels.

The motors are carried on the wheel backplates and their pinions engage with internally toothed gear rings. The road wheels, including those on the forged steel beam trailing axle, are all provided with two-spring, semi-elliptic suspension and the tyres are cushion type solids.

Four-Wheel Steering

Four-wheel Ackermann principle, steering on both axles, is tiller operated. Two independent braking systems are installed, the electrical resistance type, applied by the controller handwheel, being utilised for travel braking, and a mechanical brake with an external contracting shoe on the motor shaft drums for emergency and parking.

The two 40 V. four-pole series wound traction motors were specially designed to provide high torque/low speed characteristics. They are controlled by a direct-acting controller with cam-operated over-centre snap action contactors affording three speeds and brake in either direction. Power is supplied by a 20-cell D.P. Kathanode traction battery with a capacity of 224 Ah.

The tank itself, fabricated from rolled steel plate and galvanised on the inside after manufacture, holds 275 gallons. Housed in a separate compartment at the rear of the chassis frame is the centrifugal pump which, driven by a four-pole motor developing $1\frac{1}{2}$ h.p. at 1,950 r.p.m., delivers 27 gal. a minute against a total head of 60 ft. through 20 ft. of flexible hose with a trigger controlled nozzle.

Measuring 12 ft. $3\frac{1}{2}$ in. long by 3 ft. $6\frac{1}{2}$ in. wide overall, the tanker truck has a turning radius on full lock of 9 ft. 3 in. Maximum speeds are 6 to 7 m.p.h. and 5 to 6 m.p.h. unloaded and loaded. Carrying a full 275 gal., the truck can negotiate a gradient of 1 in 10 without serious difficulty.

ROAD ACCIDENTS IN OCTOBER.—Casualties on the roads of Great Britain during October totalled 18,806, against 17,859 in October 1952. The total includes 441 killed, compared with 418 and 4,624 seriously injured (4,470). Total casualties showed an increase of $5\frac{1}{4}$ per cent over October, 1952. This should be compared with the increase of $7\frac{3}{4}$ per cent in the number of vehicles licensed at the end of August, 1953, over the end of August, 1952.

BRITISH STANDARDS FOR CORDS AND LINES.—Two standards for cords and lines have been issued by the British Standards Institution, based on the work of the joint Equipment Standardisation Committee of the Ministry of Defence. They are intended to provide for plaited cords and a range of lines which will meet both Government and commercial requirements. B.S. 2018 provides two ranges of hemp cords. The first comprises four log cords in 72-yd. lengths—the second range comprises 14 sash cords also in 72-yd. lengths. The three ranges or hemp line in B.S. 2019 comprise ten in 40-yd. lengths (hawser-laid), five fishing lines, and 21 lines for miscellaneous purposes. The cotton lines comprise four types. In each standard, the specification deals with quality of materials, make-up, identification marking, and verification of compliance with the requirements.

RAILWAY NEWS SECTION

PERSONAL

Mr. Hugh Molson, M.P., Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, has appointed Mr. J. H. Clement to be his Private Secretary.

Mr. C. E. R. Sherrington, O.B.E., Director of Research Information Division, British Transport Commission, has been awarded an inscribed certificate of merit by the VIII Pan-American Congress for his paper "Economic effects of closing unremunerative branch lines."

The following is an extract from the Supplement, dated November 24, 1953, to the *London Gazette* of November 20, 1953, under the heading emergency commissions—Corps of Royal Engineers:—

The undermentioned Lieutenant (War Substantive Major) relinquishes his commission, November 25, 1953, and is granted the honorary rank of Colonel:—

Q. More (152579).

Mr. K. S. Robertson, M.I.Mech.E., Assistant Carriage & Wagon Engineer (Acting), Eastern & North Eastern Regions, British Railways, is retiring on December 31, 1953, after 42 years of railway service.

Mr. H. G. Nelson, M.A. (Cantab.), M.Inst.C.E., M.I.Mech.E., M.I.E.E., has been elected a member of the board of the Canadian Marconi Company. Mr. Nelson is Deputy Managing Director of the English Electric Co. Ltd., Director of Marconi's Wireless Telegraph Co. Ltd., the English Electric Valve Co. Ltd., and a number of other companies. He was for seven years Managing Director of D. Napier & Son Limited. English Electric recently acquired a controlling interest in the Canadian Marconi Company.

Mr. R. G. Laybourne, British Railways London Commercial Service Supervisor (Northern), has been appointed Assistant Chief Representative, London Commercial Service (Goods & Parcels), 13/14 Aldersgate Street, London, E.C.1. Mr. Francis T. Barnett, London Commercial Service Supervisor, (Southern), has been appointed Wool Agent at 20/22, The Wool Exchange, Coleman Street, London, E.C.2.

Mr. Henning W. Prentis, Jr., Chairman of Armstrong Cork Company, and Colonel Willard F. Rockwell, Chairman of the Rockwell Manufacturing Company, have been elected to the board of directors of the American Locomotive Company.

Last week, on the eve of leaving hospital after a period of convalescence, Mr. Alonzo Limb, Deputy Chairman & Managing Director of C. C. Wakefield & Co. Ltd., had the misfortune to break his thigh bone. He is making good progress at University College Hospital.

Mr. K. Sadagopan, M.A., I.R.A.S., who has been appointed Chief Administrative Officer, Integral Coach Factory, Perambur, Madras, joined the South Indian Railway Company as a probationary officer in the Accounts Department in 1926. After a period of three years training in the various branches of the Railway Accounts Department and having completed the professional Accounts tests, Mr. Sadagopan began work as an officer of the Accounts Department in 1929. He was promoted to be a Senior Accounts Officer in 1938, and, in 1944, he was made deputy Chief Accounts Officer. He was appointed by the Government of India as Financial Adviser & Chief Accounts Officer of the South Indian Railway on January 1, 1946. In March, 1949, Mr. Sadagopan was selected for the position of Director of Finance in the Railway Board. During his term of office of a little over four years he also officiated for a short period as the Financial Commissioner for Railways. In 1951, he was Financial Adviser to Mr. F. C. Badhwar, the Chairman of the Railway Board, upon the latter's visit to Europe in connection with the programme for procurement of rolling stock for the Indian Railways. In March, 1953, Mr. Sadagopan was sent to Switzerland by the Government of India to negotiate revision of the technical aid agreement entered into in 1949 with the Swiss Car & Elevator Manufacturing Corporation, Schlieren-Zurich, for the construction of a railway coach building factory in India and for the establishment of production of the integral type of coach in this factory. On the satisfactory conclusion of this revised agreement with the Swiss Car & Elevator Manufacturing Corporation, Mr. Sadagopan was selected by the Indian Government to take charge of the factory organisation at Perambur, Madras, and was appointed Chief Administrative Officer of the Integral Coach Factory from July of this year.

Mr. K. Sadagopan

Appointed Chief Administrative Officer, Integral Coach Factory, Perambur, India

The following is an extract from the Supplement dated November 3, 1953, to *The London Gazette* of October 30, 1953:—

The Queen has been graciously pleased to confer the award of the 1st Clasp to the Army Emergency Reserve Decoration upon the following officer:—

Major (Hon. Lt.-Colonel) L. J. M. Knotts (34221) (retired) A.I.E.E., M.I.R.S.E.

Mr. A. H. Madden, Divisional Motive Power Superintendent (Central Division), Manchester, London Midland Region, British Railways, has been appointed Divisional Motive Power Superintendent, Derby.

We regret to record the death on November 27, at the age of 74, of Mr. Herbert Ivo Bond, A.M.I.C.E., District Engineer, London West District, Southern Railway, 1919-39. Mr. Bond joined the service of the London & South Western Railway in the London District Engineer's office at Clapham Junction in 1900, and was concerned with a number of widening and reconstruction works. He was then transferred to the Chief Engineer's office at Waterloo, where he was associated mainly with the design of steel bridges; in 1904 he was attached to the Western District Engineer's office, and afterwards associated with the installation of pneumatic signalling. In connection with the latter he was sent to Paris to investigate signalling experience on the Northern Railway of France. Mr. Bond was later concerned with investigations and reports upon the strength of bridges and was engaged from time to time on work involved by the company's Bills in Parliament. In 1912 Mr. Bond became Lighting Engineer under the Chief Engineer, and, two years later, took control also of water engineering. On January 1, 1919, he was appointed London District Engineer of the L.S.W.R., at Clapham Junction. On the amalgamation of the railways in 1923, Mr. Bond's district was enlarged and modified, absorbing certain lines of the former South Eastern & Chatham and London Brighton & South Coast Railways, and became known as the London West Division of the Southern Railway. He retired from railway service in 1939. The funeral took place at East Holme on December 1, on which day a Requiem was sung and a Memorial Service was held at Dorchester.

Mr. K. Swarup

Appointed Deputy Chief Mechanical Engineer, Integral Coach Factory, Perambur, India

Mr. K. Swarup, M.B.E., A.M.I.Mech.E., who has been appointed Deputy Chief Mechanical Engineer, Indian Railways Integral Coach Factory, Perambur, Madras, graduated in science from the Agra University at the age of 19. He joined the service of the railways as a Special Class Apprentice in 1929, and was appointed as an officer on probation on the East Indian Railway in 1935, after becoming an associate member of the Institution of Mechanical Engineers. He was commissioned in the army in 1940 and attained the rank of major, in the Corps of Indian Engineers. Mr. Swarup was awarded the M.B.E. in 1943 in recognition of his services. Later in the same year he was recalled by the railways, and on his return to the East Indian Railway, he was posted to the Lilloah & Alambagh Carriage & Wagon Works, remaining there for 8 years. In 1951 Mr. Swarup was selected to go to the U.S.A. and Canada to specialise in production engineering. On his return to India he worked for a short time as a Regional Mechanical Engineer on the North Eastern Railway, subsequently transferring to the Integral Coach Factory, Perambur, as Deputy Chief Mechanical Engineer in charge of the mechanical department of the factory.

Mr. E. F. Ward has been appointed Assistant Manager in the contracts department of Johnson Phillips Limited.

Mr. R. W. Allen has been appointed north-east area representative for Nife Batteries Limited, in succession to Mr. S. K. Hodgkinson.

Mr. M. D. Davidson has been appointed Scottish Technical Sales Representative for Smiths Industrial Instruments Limited. He will operate from 153-155, Bothwell Street, Glasgow, C.2. (Telephone: Glasgow Central 3972).

Mr. J. R. Kelly who, as previously announced, joins the Board of Vickers-Armstrongs Limited on December 1, 1953, will at the same time become a Director of the following companies in the Vickers Group:—Powers-Samas Accounting Machines, Limited, G. J. Worssam & Son Limited, A.B.C. Motors Limited.

Mr. G. E. Mayne

Appointed General Manager, Eastern Region, Canadian Pacific Railway

Mr. George Everett Mayne, General Superintendent, Calgary, Canadian Pacific Railway, who as recorded in our November 6 issue, has been appointed General Manager, Eastern Region, Canadian Pacific Railway, with headquarters at Toronto, has spent the better part of his 35-year railway career in eastern Canada. He first joined the C.P.R. as an agent at Sulphide, Ontario, in 1918, and has worked as an operator and dispatcher over most of the Ontario district. In 1944, Mr. Mayne was appointed Assistant Superintendent of the Bruce Division on that district, and has since served at Sudbury and North Bay as Assistant Superintendent and has also been Superintendent of the Trenton, Schreiber and Montreal Terminals Divisions. In this latter post he carried much responsibility in the building of the C.P.R.'s modern hump retarder yard at St. Luc, near Montreal. In 1951, Mr. Mayne was appointed General Superintendent of the railway's Alberta District with headquarters at Calgary. He was appointed General Manager, Eastern Region, in October of this year.

Mr. George W. P. Page, A.C.G.I., A.M.I.E.E., Press Liaison Officer, British Thomson-Houston Co. Ltd., is retiring at the end of the current year.

We regret to record the death on November 30, at the age of 82, of Captain G. T. Blaxland, O.B.E., formerly Commodore of the Southern Railway's cross-Channel boats based on Dover and Folkestone. He retired in 1932.

Mr. F. S. Fletcher is retiring next summer from his position as Consultant and Adviser to the Tees Side Bridge & Engineering Works Limited, Middlesbrough. For more than 30 years he was a Director & General Manager of the company.

Mr. J. R. M. Williams has been appointed Northern Ireland Regional Sales Manager of Leyland Motors Limited in succession to the late Mr. C. R. Clutsom. Mr. Williams, who has been a member of the company's North Western sales staff since the war, will take up his appointment early in the New Year.

Mr. R. N. Barlow

Appointed District Operating Superintendent, Wakefield, N.E. Region, British Railways

Mr. R. N. Barlow, Assistant District Operating Superintendent, Leeds, who has been appointed District Operating Superintendent, Wakefield, will take over his new post on December 2. Mr. Barlow was educated at Clay Cross Secondary School, Derbyshire. He began his railway career with the Midland Railway at Clay Cross Station in 1913, and saw service with the Notts. & Derby, South Staffords and Leicestershire Regiments in the 1914-18 war. On demobilisation he was appointed to Killamarsh, and, after gaining experience as relief clerk, he became District Signalman's Inspector at Crewe (1931-34) and subsequently District Traffic Inspector at Bletchley and at Rotherham (Masboro'). In 1944 he was appointed Assistant District Controller at Peterborough, and a year later took up a similar post at Rugby, subsequently being promoted to be Assistant to the District Operating Manager, Rugby. He came to the West Riding in 1948 as Assistant District Operating Superintendent, Leeds, which post he now leaves to take up his new appointment at Wakefield.

Mr. E. L. Triffitt, District Engineer, York, North Eastern Region, British Railways, has been appointed Assistant Engineer (Permanent Way), York.

Mr. H. Ormiston, Assistant Engineer (Permanent Way) has been appointed District Engineer, York.

Mr. G. W. Baker has been appointed resident Fork Truck Sales Engineer, Yorkshire, Durham and Northumberland, for Coventry Climax Engines Limited. His address is 109, Redesdale Gardens, Adel, Leeds, 6. Telephone: Leeds 73829.

Mr. J. Twiggins has joined the Fork Truck Technical Sales Department of the company. He will deal with technical enquiries and special handling applications.

Mr. Oliver Hall, Special Director and Financial Controller, Metropolitan-Cammell Carriage & Wagon Co. Ltd., having reached normal retiring age, will relinquish his appointment on December 31. He will be succeeded by Mr. W. Scott, Chief Accountant.

Ministry of Transport Accident Report

Near Stratford, April 8, 1953: *London Transport Executive, Central Line*

Colonel D. McMullen, Inspecting Officer of Railways, Ministry of Transport, inquired into the accident which occurred near Stratford, on the Central Line, London Transport Executive, at about 6.56 p.m. on April 8, 1953, when train 59, moving under the "stop and proceed" rule, having passed automatic signal A.489 at Stratford at danger, collided with train 71, standing in the tube, just about to move forward. Each was composed of eight cars and was carrying between 400 and 500 passengers. The second car of train 59 was telescoped into the leading one for about 6 ft. and nine passengers were killed and three fatally injured. Four passengers and the driver of train 59 were seriously injured. (The driver could not give evidence until August 6.)

Assistance was speedily obtained, but rescue work was extremely difficult. Although the first stretcher case was removed at 8.20 a.m. it was not possible to release the last two seriously injured men until about 2.15 the following morning. There was no serious arcing or fire and current was discharged from the section at the time of the collision. It was not possible to resume normal working until 10.0 a.m. on April 10. The accompanying diagram shows the lines signals and other details essential to an understanding of the case.

The line is fitted with L.T.E. standard track circuit signalling with train stops and train stop proving, and all circuits were found to be in proper order. The cause of signal A.489 being held at danger was that the train stop at the next signal, A.491, had been damaged by a heavy hook and loose side chain on an eastbound train. "Stop and proceed" working had been put into operation from 6.12 p.m. and two porters were posted at Stratford to advise drivers and guards that signal A.489 was remaining at red. At that time it was not known to anyone at that station that signal A.491 also was not clearing to green.

Train 71 was the twelfth to pass signal A.489 at red and stopped behind train 39, standing at A.491. Shortly after that 39 moved forward and 71 was about to do the same when the collision occurred. Damage to the trains was extensive. The report gives full details and a drawing showing the telescoping.

Authorised by Statutory Order for L.T.E. lines, this is applied to stop signals without telephones, such as A.489, on the initiative of the driver, when the signal remains at red. Generally the rule requires him to wait one minute and then proceed cautiously as far as the line is clear, or to the next stop signal, at such a speed as to enable him to stop short of any obstruction, having regard to conditions of curvature and occupation of the line ahead by a train. The need for caution is specially emphasised in the Rule Book by capital letters. The report gives the text of this rule, 55(g), and of others relevant, such as Rules 77, 78 and 81.

Evidence

Evidence was given by the drivers and guards of the two trains that preceded No. 59 regarding their departure from Stratford, visibility in the tunnel and action taken after the collision.

The driver of colliding train 59 said a porter told him signal A.489 had failed and he was to pass it. No mention was made of caution, of other trains being ahead, or of the "trip cock" or "tripping." The guard was being informed by another porter and he did not speak to him on the train telephone. He was tripped and stopped in about 2 yd., having applied the brake to reduce jerking. He re-set the cock, waited for air pressure to be re-created, released the brake and started. He coasted cautiously into the tunnel, applying the e.p. brake gently. The speed, he said, was constant at 5 to 8 m.p.h. Suddenly he encountered a bank of thick dust about 6 to 7 ft. deep and, passing through, saw train 71 2 yd. ahead. He released the deadman's handle and made a full brake application. He was certain he was tripped at signal A.489, where he got down on the ballast. (At that date the ballast extended only 3 ft. beyond the signal. Beyond that the sleepers were laid on an open concrete foundation.) The seal of the control governor cut-out switch was found broken. He said he noticed it in that condition when taking over. It was then closed and he had not touched it. He insisted that his speed was never more than 5-8 m.p.h., although it was difficult to judge in a tunnel. He was told that the sighting distance of both tail lamps ahead was about 170 ft. and said if he had seen them he could have stopped a car-length (50 ft.) clear.

He described the dust cloud, the effect of which he had never experienced before except in fog; nor had he heard other motormen tell of such. He thought it was accounted for by the train in front being tripped and causing dust. He thought he saw the electric tail light first. He might, on the spur of the moment, have told passengers that the Stratford staff should never have let him down; he explained that by saying he thought that one of the trains being so close he should have been held there for a time limit with the staff knowing the situation. He did not know that signal A.491 also was remaining at red. "I was expecting to find a signal at danger but definitely not a train in that position. Really I was looking for anything ahead. Actually I never stopped looking. I was going cautiously in case of anything in front of me, whatever it was."

His brakes were working satisfactorily and he did not think the tunnel lights affected sighting the signals. He experienced no difficulty in that when going from the light to the darkness of the tunnel. He noticed no smoke or mist hanging over the entrance. He appreciated there was a steep gradient and always drove cautiously, remembering the previous accident there. To the inspector who accompanied him to hospital he remarked "suddenly there was a cloud of smoke and then a crash."

The guard of this train said that at Stratford a porter told him the signal had failed and after 2½ min. the rightaway was given from the front. They started slowly and he was uncertain whether they were tripped, not noticing the air gauge reading. He was opposite the station name board by the refreshment room at the second stop. No emergency brake application preceded the collision; the train was definitely travelling more slowly than usual. He thought they left Stratford under Rule 55(g) but later amended that to Rule 77, when shown it.

The three drivers referred to all said that the Stratford porter neither referred to the need for caution nor that they should trip past signal A.489; nor again that the trip cock should be isolated. The driver of the train following No. 59, however, said the porter definitely told him to cut the trip cock out, but he would not have done so without instructions from higher authority.

Passengers' estimates of speed varied much. One passenger, anxious to get home, thought they were running normally after Stratford, as did another.

A passenger in train 71 said he remembered it being tripped before Stratford, but not a second stop there; if there was one it certainly was not like the earlier "tripped" one. He heard the one behind apparently travelling at a fair and

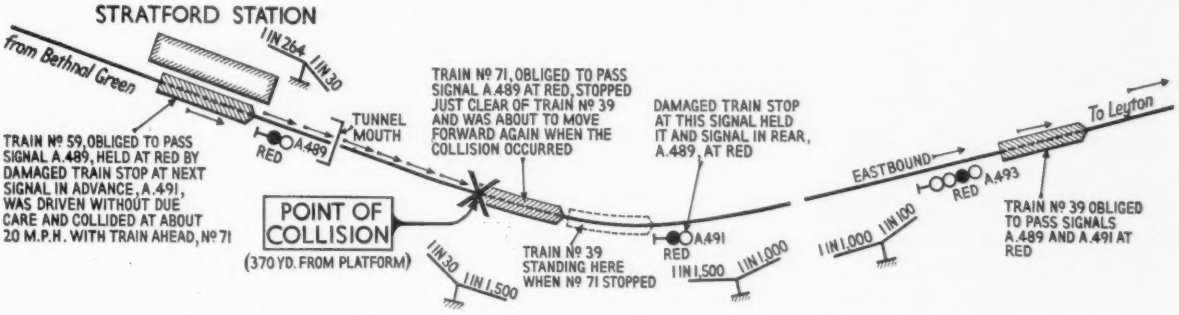

STRATFORD STATION
1 IN 264
1 IN 30
From Bethnal Green
TRAIN Nº 59, OBLIGED TO PASS SIGNAL A.489, HELD AT RED BY DAMAGED TRAIN STOP AT NEXT SIGNAL IN ADVANCE, A.491, WAS DRIVEN WITHOUT DUE CARE AND COLLIDED AT ABOUT 20 M.P.H. WITH TRAIN AHEAD, Nº 71
TUNNEL MOUTH
A.489 RED
TRAIN Nº 71, OBLIGED TO PASS SIGNAL A.489 AT RED, STOPPED JUST CLEAR OF TRAIN Nº 39 AND WAS ABOUT TO MOVE FORWARD AGAIN WHEN THE COLLISION OCCURRED
DAMAGED TRAIN STOP AT THIS SIGNAL HELD IT AND SIGNAL IN REAR, A.489, AT RED
POINT OF COLLISION
(370 YD. FROM PLATFORM)
1 IN 30
1 IN 1,500
TRAIN Nº 39 STANDING HERE WHEN Nº 71 STOPPED
A.491 RED
1 IN 1,500
1 IN 1,000
To Leyton
EASTBOUND
A.493 RED
1 IN 1,000
1 IN 100
TRAIN Nº 39 OBLIGED TO PASS SIGNALS A.489 AND A.491 AT RED

Diagram showing circumstances of accident near Stratford, London Transport Executive, April 8, 1953

increasing speed. "It occurred to me that at the speed I thought it was travelling it would never stop before hitting us. . . ."

The Stratford station inspector, seeing an L.T.E. inspector on the platform, assumed he had taken charge; that inspector entered the driving compartment of a train, not tripped at signal A.489. He commented on it to his foreman. He satisfied himself that the next trains (39 and 71) were tripped and gave no instructions about isolating trip cocks. He did not know before the accident that there was a copy of the L.T.E. Rule Book at the station; he had never been examined in those rules.

The station foreman, realising signal A.489 was not clearing, told a porter to report it to Control, which replied that all trains should be warned. He instructed porters to advise drivers and guards to wait 4 min. before proceeding cautiously and himself advised some guards. He gave no trip cock instructions. The train carrying the L.T.E. inspector was not tripped. He thought the rules prescribed 2 min. but ordered 4 as a precaution.

The porter at the signal said he was additionally instructed by the L.T.E. inspector to warn all drivers and tell them to cut out their trip cocks and re-set after passing the signal. He was certain he did that and that they did so. One questioned the instructions. He gave no order to the train which the inspector accompanied but saw the driver isolate the cock, which he thought had to be done before a train could pass such a signal.

The L.T.E. Divisional Inspector heard a porter tell drivers to proceed with caution. After speaking to the staff and to Control he entered the cab of train 12, where there was a lineman. They stopped beyond the signal and he thought they had been tripped. At signal A.491 the lineman found the broken train-stop. Advising Control from Leyton he returned to Stratford and heard of the accident. Later he concluded his train was not tripped, but could not recollect mentioning "tripping" or "tripcock" to the porter.

Drivers were acting under Rule 55(g); there was no need for a hand signalman under it, although porters were posted on this occasion and knew their duty. It was usual for a member of the staff to warn drivers in such circumstances. Rule 77 normally was used for a defective signal and required a hand signalman to instruct drivers. The word hand signalman was a misnomer for the porters.

The lineman could not remember whether train 12 was tripped at signal A.489.

The report gives full details of the process and times of detraining the passengers in stalled trains. All uninjured passengers were reported as having been got out of train 71 at 9.49 p.m.

Tests

Nothing could be found wrong with the brakes on train 59. A train was stationed in the tunnel where No. 71 had done so and another loaded equal to 435 passengers taken slowly towards it. Its oil tail light was sighted from the driver's side at 214 ft. and both at 167. These positions were marked, as well as where the tail of the train ahead was standing, and that train was taken away. At nearly 19 m.p.h. an emergency brake application, where both lights had been seen, gave an over-run past the tail point of 15 to 16 ft. At 14 m.p.h. the stop was made about 50 ft. clear, and at lower speeds at greater distances. The weighted train was then allowed to run freely down from 100 ft. in advance of signal A.489. At the tail of train point it had reached 21·8 m.p.h. Another set of tests, detailed in the report, were made, with trains running to represent as closely as possible the conditions near and at the time of the accident, to see what dust could be raised and its effects. No dust was raised by the movement of the trains alone. When it was created artificially it banked up against a stationary train, which stood where 71 had done. The tail lights could be seen dimly at 165 ft. and clearly at 147.

The Chief Mechanical Engineer, Railways, London Transport Executive, thought, from the extent of the damage, that speed on collision was not less than 15 m.p.h.

Inspecting Officer's Conclusions

Colonel McMullen has no doubt that the driver failed to comply with the "stop and proceed" rule and did not exercise reasonable caution. The rule is perfectly clear. Judging speed in a tunnel is difficult, even for an experienced driver, and the evidence of some witnesses is considered to be erroneous, although given in good faith. Considerable weight attaches to that of two passengers who thought the speed normal for that part of the line. Taking everything into account and having carefully examined the wrecked cars, Colonel McMullen considers the speed on collision to have been about 20 m.p.h. Using that as a basis and allowing a certain reaction time, had the driver made an emergency brake application on seeing the oil tail light he would have struck the train ahead at 7 m.p.h., but there is no evidence of any. The reason given by the driver was a thick cloud of dust, which he described in detail.

Colonel McMullen nevertheless finds great difficulty in accepting that, in view of the tests. The driver mentioned dust to several people, but had been peering ahead with his forehead close to the front window and, among other serious injuries, his head was severely bruised. According to medical opinion he probably lost consciousness for a short time. When he came to there was undoubtedly much dust. He may have genuinely thought the dust to have been present before the collision.

Colonel McMullen discussed this with three medical authorities, of whom one thought the driver probably had no recollection of events 5-10 min. before the collision. Such "retrograde amnesia" frequently resulted from concussion, or a serious blow on the head.

The driver's remarks about the action of the Stratford staff made Colonel McMullen certain he was not expecting a train where No. 71 was. If he expected one at all he probably thought it to be at signal A.491 and imagined he had a clear braking distance of 400 ft., the distance required to stop from just under 22 m.p.h. with 2 sec. reaction time. It is thought, therefore, that he allowed the train to coast with little, if any, brake power applied, almost up to the impact, by which time speed was about 20 m.p.h., although it should not have exceeded 5. Colonel McMullen believes there was no dust before the collision and can only assume that the driver, not expecting a train where 71 was, was not keeping a careful lookout. He probably endeavoured to reconstruct events in his mind and became convinced he actually did comply with the rules, which would account for variations between his evidence and that of others.

He is 43 and became guard in 1946, qualifying as driver in 1949 with Rule Book examination. He was promoted driver in 1952, but had already worked as such for 93 days. He was not then re-examined on rules. He attended a three-day refresher course in February, 1953, one day being devoted to the Rule Book and particularly passing signals at danger. He had no home worries, was not tired and felt quite fit. He was medically examined, with eyesight test, in 1949; he had a clear record and had served in the Army with distinction. He gave evidence in a straightforward manner.

Evidence regarding the tripping of train 59 was conflicting, but Colonel McMullen does not doubt there was none. The train before 39 also was not tripped and in at least one other case the trip cocks must have been isolated. The drivers of trains, 39, 71 and 59 denied receiving any instruction from the porter to isolate, but the latter was certain he gave it. (This was confirmed by the driver of the train following 59.) The porter did not appreciate its significance. He alleged that the L.T.E. inspector gave him it. Colonel McMullen is sure that was not so, but the porter may have misunderstood somebody's remark about "tripping" and "tripcocks." This particular inspector, with the station inspector and foreman, might have taken more effective action. The two last should have spoken to Control and received instructions themselves, not left it to a porter. It is difficult to appreciate how the divisional inspector failed to realise that the train he rode on was not tripped and take appropriate action.

There seems to have been some delay in detraining from 39 and 71 trains, but when permitted it was carried out as expeditiously as possible.

Remarks and Recommendations

This is the first accident fatal to passengers in a tube section of railway in nearly 63 years, but the second collision in almost the same place. The first, fatal to one railway servant, was on December 5, 1946, and concerned empty trains. It also was due to failure to observe the "stop and proceed" rule. (See *The Railway Gazette*, December 5, 1947, page 654). The accident in the open in a fog at Northwood Hills in 1945 (see *The Railway Gazette*, July 26, 1946, page 104) caused the death of three persons. There were less serious ones of the same class at Harrow in 1947, between Eastcote and Rayners Lane in 1948, and between South Ealing and Acton Town in 1949. "Stop and proceed" working has been found necessary on L.T.E. lines, all of which have a very intensive service and, generally speaking, only when it has to be adopted does safety depend completely on the human element. It has to be resorted to in order to enable a disabled train to be pushed, or to meet track circuit or signal failures. These have greatly declined of recent years and the comparatively small number of accidents is indicative of the caution generally exercised by drivers.

After the previous Stratford accident Lt.-Colonel E. Woodhouse recommended that staff be continually reminded of the risks involved. A notice was inserted annually in the *Railway Traffic Circular*, the last in September, 1952, but some more positive action is necessary. To abolish this working would dislocate the service completely.

Provision of some form of mechanical or electrical governor, again under consideration, has been found impracticable. It would have to be set at the lowest safe speed, say 5 m.p.h., which would be too low in many places and cause serious delays, with most adverse psychological effect on drivers. It would have to be completely reliable and the difficulty of

maintaining equipment seldom used would be very great.

Colonel Woodhouse pointed out that there was no satisfactory speedometer able to stand the rough usage and give accurate low speed readings, while it is more important that the driver keep a careful lookout than that he should watch a dial. A newer pneumatic speedometer, with first scale marking 15 m.p.h., is valueless to a driver running under "stop and proceed." A scheme has, however, been set before Colonel McMullen, involving a considerable number of additional signals and train-stops. It should have the desired results. It is recommended to proceed with its development and application as rapidly as possible. Meanwhile a senior official has been posted to the Stratford area during morning and evening peaks, and up to 11 p.m. each night, to take immediate personal charge of any unusual situation.

Need for better discipline in use of tunnel wires is apparent and doubtless will receive attention. In some cases relaying of a message from driver to Control is too slow, and it can become distorted. It would have been much more satisfactory had there been direct communication, advocated by the Inspecting Officers for many years. Colonel McMullen is glad to report that a new system by which that is possible is being tried on the Northern Line and it is hoped to be able to extend it generally.

Stacatruc Development Limited.—At an extraordinary general meeting of Stacatruc Development Limited on November 9, a resolution was passed that the company be wound up voluntarily. Stacatruc Development Limited was registered on March 1, 1949, partly to safeguard the name Stacatruc and their ancillary equipments. This work now is carried out by I.T.D. Limited, and as the name Stacatruc has since been registered as a trade name, liquidation was decided on.

Sir Brian Robertson's Message to Staff of B.T.C.

Keener competition with nationalised transport; insufficiency of capital expenditure on railways

A personal message has been sent by Sir Brian Robertson, Chairman of the British Transport Commission, to all members of the Commission's staff.

"On taking up my job as Chairman of the British Transport Commission," he states, "I am very conscious that I and my colleagues on the Commission can do nothing save with the co-operation of the 600,000 men and women who work on the railways and the 275,000 in the other activities controlled by the Commission. The chief purpose of this message is to ask for that co-operation.

"I know that, at this time, there is a certain amount of public criticism, not by any means all justified, directed particularly at our railways.

"There is also no disguising the fact that we are faced today with considerable competition, and this will become even keener in the future. Unless the service which we give is good enough to attract business, the organisation, together with the prospects of those who work in it, will indeed go downhill. There is no reason why this should happen.

"I believe it to be true, in fact, that we have the finest transport system in the world. I also believe that our staff in all grades and in all our many services, have capabilities of technical skill, loyalty and honest work which are unsurpassed anywhere.

Capital Expenditure on Railways

"Is there anything lacking? In the first place, particularly on the railways, over a long period insufficient money has been available to maintain, renew and modernise our equipment. It is up to me and my colleagues to find the necessary money somehow. We shall only succeed if we can prove that money provided will bring in a fair return.

"In the second place, our railways, and to some extent our other services, have been subjected to a number of re-organisations in recent years. These have necessarily had some unsettling effect.

Carrying Britain to Prosperity

"A fine professional pride is traditional in our industry; it is supremely important to preserve it. And why not? Our job may be difficult and often exacting, but surely it is immensely worth while. That is what matters about a job, more than anything else. Our job is to carry Britain to prosperity.

"In this you all have a share whether you are working on the railways, London Transport, our road passenger and freight services, our docks and canals, or in our hotels and catering services. All of these are important: each makes an essential contribution to Britain's transport system as a whole.

"At all events, know this about your new Chairman. He does not propose to spend all his time polishing the seat of his office chair. He looks forward to meeting as many of you as time and space will allow. He wants to work with you and for you. As regards your representative bodies, the trade unions, he feels some confidence in gaining their goodwill because he is no stranger to them.

"We belong to the nation. We serve the nation. If we do so with loyalty, enthusiasm, and co-operation, we shall not only feel proud of ourselves, but we shall make the nation proud of us."

Sir Brian Robertson Visits Railway Installations

Sir Brian Robertson, Chairman, British Transport Commission, last week paid his first visits to railway installations. (Left) At Old Oak Common Staff Hostel, Western Region; Mr. K. W. C. Grand, Chief Regional Manager, is on left. (Right) In Willesden Carriage Cleaning Depot canteen, London Midland Region, with Mr. J. W. Watkins, Chief Regional Manager

Awards to B.T.C. Police

At the York Railway Institute on November 23, General Sir Daril G. Watson, Chief of General Services, British Transport Commission, presented long service and good conduct medals to 166 serving and retired police officers and widows.

Accompanying Sir Daril Watson were Mr. J. L. Harrington, Chief Officer (Marine), British Transport Commission; Mr. H. A. Short, Chief Regional Manager, North Eastern Region, and Mr. B. X. Jessop, Assistant Chief Regional Manager; Colonel H. S. Cole, Chief of Police, Northern Area; Mr. H. W. R. Ogram, General Manager, Associated Humber Lines, and Mr. S. W. Jesper, Public Relations & Publicity Officer, North Eastern Region.

Sir Daril Watson congratulated Colonel Cole on the excellent record and turnout of the men, and thanked Mr. Short.

Mr. Short stated in reply that many generals had come through York since the days of the Romans, but to this one at least he extended a most hearty welcome. He expressed his agreement with Sir Daril Watson's remarks on the good turnout of the parade, and said he was proud of the fact that so many North Eastern Region men had received awards.

Paraguay Central Railway Co. Ltd.

The report of the Paraguay Central Railway Co. Ltd., of which Sir Bernhard Binder is Chairman, for the year ended June 30, 1953, shows gross receipts were G35,810,440, and expenses G30,803,251, compared with G19,183,656 and G16,588,565 respectively for 1951-52. The surplus on working, therefore, was G5,007,194, an increase of nearly 93 per cent over the preceding year. Gross earnings increased because of raising of tariffs on four occasions during the year.

Exchange Difficulties

It is pointed out that exchange restrictions and differences in rates of exchange preclude a reliable conversion rate into sterling. For the purpose of the accounts the Paraguayan currency figures have been converted at G42 to the £ against G25·20 last year.

Remittances from Paraguay have only been granted by the exchange authorities to cover the cost of equipment and stores shipped from the United Kingdom. These amounted to £42,270 during the year under review compared with £32,400 for the previous year. Because of the inability to obtain sufficient foreign exchange it was only possible to finance a small proportion of the heavy programme of necessary maintenance and renewals and capital works.

The net revenue account shows that after provision for exchange loss, fixed charges on the prior lien and "A" debenture stocks, tax, and so on, there is a debit balance on net revenue account for the year of £123,941. After adding this to the debit balance brought forward from the previous year of £634,263 there is a total debit balance of £758,204 on net revenue account at June 30, 1953, to be carried forward. The amount of the general reserve account, £196,360, offsets to that extent the debit balance of £758,204 on net revenue account.

At meetings of the holders of the prior lien and "A" debenture stocks in December, 1952, the moratoria in respect of the postponement of the payment of the interest on those stocks were renewed for a further period of one year from January 15, 1953.

"Princess Victoria" Appeal Lost by B.T.C.

The Lord Chief Justice of Northern Ireland, Lord MacDermott, in a reserved judgment delivered in the High Court in Belfast on November 26, dismissed, with a modification in the findings of default, the appeal of the British Transport Commission against the findings of default made in the report of the Court of Inquiry which investigated the sinking of the British Railways *Princess Victoria* on her voyage from Stranraer to Larne on January 31, 1953. (An account of the Court of Inquiry findings was given in our June 19 issue.)

The appeal of the registered Manager, Captain J. D. Reed, Manager, Irish Shipping Services, British Railways, was allowed but default was found against his predecessor, Captain H. J. B. Perry, who was Marine Superintendent, British Railways, Scottish Region, from 1948-52.

Referring to the incident in 1951, when heavy seas damaged the stern doors and flooded the car deck of the vessel, Lord MacDermott said that, while Captain Reed was open to grave criticism for not having arranged to inform himself of all damage to the ships under his care, and for not having impressed on his assistant the importance of keeping the *Princess Victoria* under strict observation because of her novel construction, the Court thought the evidence insufficient to substantiate a finding of default against him.

The Court held that the three main causes for the loss of the ship were "the inadequacy" (to quote the words of the Court of Inquiry) of the stern doors, the inadequacy of clearing arrangements for the water which accumulated on the freeboard deck, and the shifting of the cargo.

Owners "Sanguine"

It was now easy, Lord MacDermott continued, to see that the design of the vessel was not suitable for round-the-year service on this particular route, but the Court was not satisfied that the owners were guilty of default at the commencement of the ship's service. They might have been too sanguine. The Court was satisfied that the default existed by the end of 1951, if not earlier. By then the owners should have appreciated that the ship was vulnerable, and have acted to abate the danger before another winter. Lord MacDermott stated that his three assessors, Professor L. C. Burrill, Professor of Naval Architecture at Durham University, Captain P. S. Robinson, retired master mariner, and Mr. J. Wallace, retired chief marine engineer, concurred in the views and conclusions.

No order was made as to costs, but the Lord Chief Justice said that the Commission would be required to pay the fees and expenses incurred by the assessors. The British Transport Commission stated on December 1 that while the appeal decision does not determine the liability of the Commission to pay damages in respect of those who perished or were injured in the disaster, it does not propose, in view of the findings of the Lord Chief Justice, to dispute this liability or to seek to limit it under the Merchant Shipping Act, 1894. The Commission, therefore, is prepared to pay to the persons entitled such proper damages as may be agreed.

Parliamentary Notes

Problem for British Railways

In the House of Commons debate on modernisation of roads on November 27, Mr. G. A. Pargiter (Southall—Lab.) drew attention to the surfaces of roads over railway bridges. There had been a long standing dispute between the highway authorities and the B.T.C., he said, and with the Railway Executive before that. The real culprit was the Commission and possibly in a lesser degree the Ministry of Transport, through not insisting that the bodies concerned should negotiate a proper agreement for getting the work done.

Mr. Ernest Davies (Enfield East—Lab.) said that in planning new towns, the adjustment of road and railway services had not been properly inter-related. With Harlow, much traffic to London in the Harlow direction on the Liverpool Street-Cambridge line came on to the roads because of the inadequacy of the unelectrified railway service.

Mr. Ralph Assheton (Blackburn West —C.) said many of the millions of pounds that Britain had spent in other countries in the last century would have been much better spent in developing British roads. It was nice to build a railway system for the Argentinians, although they deprived British investors of the profit of it by appropriating it and paying very little for these assets.

That money, he added, would have been better spent in developing roads in this country, himself he was a railway director in the days of private railway enterprise and he thought it a pity that the railways were not allowed to take a hand in the development of road transport in the early stages. That was one of the great mistakes made by Parliament.

Questions in Parliament

Railway Safety Devices

Mr. Gerald Nabarro (Kidderminster —C.) on November 25 asked whether the Minister of Transport & Civil Aviation had now considered all the implications of the report on the Harrow accident; and whether he would make a statement as to the measures he proposed to adopt to improve railway safety in every sphere, including standardisation and general application of systems of multi-light colour signalling and automatic train control devices.

Mr. Hugh Molson (Parliamentary Secretary to the Ministry of Transport) in reply said the Minister of Transport and Civil Aviation (Mr. Alan Lennox-Boyd) had now considered all the implications of the report. As he had told the House on July 6, the B.T.C., which was responsible for safety of railway operation, had decided to extend automatic train control. Trials with new equipment designed for that purpose were being conducted on the Barnet-Huntingdon line. In addition, multi-aspect colour light signalling was being extended where justified by the traffic. The standards for new signalling works were laid down in the official publication entitled "Requirements for Passenger Lines and recommendations for Goods Lines."

Mr. Nabarro: A very good answer.

Export Subsidies

Mr. J. Grimond (Orkney & Shetland— L.) asked the President of the Board of Trade what information he had on the extent to which British exports, particularly of locomotives, had been adversely affected by exports from

Western Germany competing with the aid of a Government subsidy.

Mr. Derick Heathcoat-Amory (Minister of State, Board of Trade) said: I have no evidence that the export of capital goods, including locomotives, is directly subsidised by the Government of Western Germany. All German exporters receive some benefit from the remission of a portion of their tax payments. H.M. Government has taken the lead in international efforts to eliminate export incentive of this kind which amounts to an indirect subsidy.

Staff & Labour Matters

Engineering Wage Claim

The Headquarters of the Engineering & Allied Employers' National Federation and of the Shipbuilding Employers' Federation had advised engineering and shipbuilding firms to keep factories and shipyards open as usual on Wednesday, December 2, the day fixed by the Conference of Shipbuilding & Engineering Unions for the staging of the 24-hr. strike as a protest against the rejection of the wage claim for a 15 per cent increase in pay.

Members of the Engineering & Allied Employers' National Federation were advised to inform their employees that their works would be open and to give the men encouragement to attend as usual. It was suggested that any employee who presented himself for work should be found work wherever possible and paid accordingly. If work could not be found for the whole shift, employees should be paid at their consolidated time rate for the remaining hours of the shift. Firms were reminded that indentured apprentices are not allowed to join in industrial disputes. It is understood that similar advice was given to shipbuilding employers by their federation.

Opposition to Strike Among Unions

After a meeting in London on November 27, the General Secretary of the National Union of General & Municipal Workers announced that his executive had decided that members of the Union would not be called out in support of the strike. Both the N.U.G.M.W. and the T.G.W.U. have been opposed to strike action and have advocated the setting up of a court of inquiry to deal with the dispute.

The decision of the N.U.G.M.W. was based on one of the C.S.E.U. rules which states that no affiliated union should be requested to withdraw members until a decision has been taken in accordance with the union's own rules, and that any general movement by the union shall "if necessary" be submitted to a ballot vote. The General Secretary of the N.U.G.M.W. has stated that the union's own rules provide for a vote of members before a strike can take place. Reports from the union's districts showed that many members were opposed to a stoppage of work without a ballot.

Leaders of the C.S.E.U. announced that it was not intended that public utilities and firms outside the Engineering Employers' Federation should be involved in the strike if pay claims had not been rejected or were being negotiated. Efforts to prevent workers in civil air transport from participating in the strike continued over last weekend as talks with the airways' management in regard to a claim for a 15 per cent increase in pay were in process.

Reports as we went to press stated that by the evening of December 2 the response to the call for a strike differed greatly in different parts of the country. Estimates of the numbers on strike varied from 1,000,000 to 1,500,000.

Contracts & Tenders

An order has been placed with Rail Traction Supplies Limited for 70 Vent-Axia extractor fans for use on the rolling stock of Rhodesia Railways.

The English Electric Co. Ltd., has received an order for ten mixed-traffic Bo-Bo diesel-electric locomotives, of 750 h.p., for the Nigerian Railway. They will be powered by English Electric 6 SRKT-type engines and will be similar to the ten diesel-electric locomotives which the firm is already building for the Gold Coast Railway. The locomotives for Nigeria will handle groundnuts traffic and will be serviced at Zaria.

Wiener Lokomotivfabrik AG. has received an order under the Indian Railway Board 1954-55 Programme for 60 "WG" locomotives.

British Railways, Eastern Region, have placed a contract with Tangyes Limited, Smethwick for supply and delivery of one Tangye axle journal re-turning and burnishing lathe for Doncaster Carriage Works.

British Railways, Southern Region, have placed the following contracts:—

R. J. Barwick, Dover: restoration of war damage, Dover Priory main station buildings

Cooper Wettern & Co. Ltd., Croydon: supply and delivery of artificial stone units

Marco Conveyor & Engineering Co. Ltd., Leytonstone: supply and erection of coal handling plant, Brighton works

The Cementation Co. Ltd., London, S.W.1: piling to foundations, Purley new signal box

T. W. Palmer & Co. (Merton Abbey) Ltd., London, S.W.19: steel and ironwork for oil fuelling installation, Dover Marine

Carricks (London) Ltd., London, W.11: supply and installation of "Airheat" units, Bricklayers Arms Repair Shop

J. Westwood & Co. Ltd., Millwall, E.14: supply and delivery of welded bearings, Staines River Bridge

The Director General, India Store Department, in inviting tenders for the supply of machines, as specified in Official Notices on page 643.

The High Commissioner for India is inviting tenders for carriage and wagon wheels and axles. Details are given under Official Notices on page 643.

It is proposed to invite tenders for a rail-road bridge over the River Ganga (Ganges) near Mokameh, Bihar, India. Details are given under Official Notices on page 643.

The Special Register Information Service, Export Services Branch, Board of Trade, has been notified by the British Embassy at Bangkok of a call for tenders (No. 96414) issued by the Railways Organisation of Thailand for:—

400 sets buffer slack gathering gear for coaches and wagons, as per drawing P.G. 5-2001

30 sets buffer slack gathering gear for locomotives, as per drawing L/M 1498

These articles must be in accordance with the descriptions given in the drawings

The closing date for receipt of tenders is 10 a.m. on December 18. Tenders should be enclosed in sealed envelopes endorsed "Tender for buffer slack gathering gear for carriages and engines No. 96414," and addressed to the Chief of Stores Office, Railway Organisation of Thailand, Bangkok. Tenderers must deposit a sum of 7,000 baht and ask for the receipt with the signature of the committee.

Tender documents in Siamese may be obtained from the Supply Section, Stores Office, Railway Organisation of Thailand, Bangkok, on payment of 160 Ticals per set. One copy of an unofficial translation of the tender documents as provided by the Thai Railway Organisation, with the abovementioned drawings, is available for loan to United Kingdom firms in order of receipt of application to the Branch, Room 801, Lacon House, Theobalds Road, London, W.C.1.

The Special Register Information Service, Board of Trade, Export Services Branch, reports that the United Kingdom Trade Commissioner at Karachi has notified a call for tenders for the supply of 14 broad gauge diesel railcars and 24 trailer coaches for the North Western Railway. The closing date for receipt of tenders is noon on January 9.

Tender documents and specifications, etc., may be obtained from the Director General (Railways) Railway Division, Ministry of Communications, Room 348, 2nd Floor, Multi-storeyed Building, ADJ Assembly Building, Kingsway, Karachi, on payment of Rs. 100 (not refundable). The tender documents are not available in the Branch. It is understood that tenders will only be considered from firms who already have similar vehicles in successful service.

United Kingdom firms are reminded that tenders must be submitted through local accredited agents. A list of some local firms who have expressed willingness to submit tenders on behalf of United Kingdom firms not already represented in Pakistan is available from the Branch, Lacon House, Theobalds Road, London, W.C.1.

The Special Register Information Service, Export Services Branch, Board of Trade, has been notified by the United Kingdom Trade Commissioner at Johannesburg of a call for tenders (No. B. 6939) issued by the Stores Department of the South African Railways, for the supply of carriage fittings including extruded manganese bronze, brass angles, lock bolts, racks, sash balances, buckles, spring catches, hooks, hook catches, ball catches with and without plate, clips, end door brass cups, handles, door springs, door hangers, locks, deck light openers, various metal plates, lavatory basins, hinges, taps, pinch blinds, wash basins and vestibule diaphragms.

Although drawings which specify existing standard material are quoted in this enquiry, it is the Administration's desire to replace copper-based alloy fittings with similar fittings of modern design manufactured from material which would never require plating and could be kept clean by wiping with a dry, clean cloth. To ensure ease of replacement the methods and dimensions of fixings should remain standard but in some applications considerable changes in shape might be advantageous.

As it will be essential to adopt differing alloys to suit various fittings, tenderers must submit designs and alloy compositions with their quotations against the items in which they are interested. The designs thus submitted would, if adopted as the future standard, become the property of the Administration and be used in future enquiries intended for open competition for articles which could be used to replace existing fittings, thus releasing copper alloys for reclamation and use elsewhere.

The closing date for receipt of tenders is 9 a.m. on January 7. Tenders must be

enclosed in a sealed envelope endorsed "Tender No. B. 6939 for Carriage Fittings," and addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Tenderers offering goods for import are required to quote both for delivery f.o.b. and for delivery free on rail in bond and are also required to state what proportion of the goods (if any) could be supplied against their own import quotas.

The drawings referred to in the tender documents may be inspected at the Offices of the High Commissioner for the Union of South Africa, Trafalgar Square, London, W.C.2, or many be obtained on application to the Office of the Chief Stores Superintendent, Room 209, Park Chambers, Rissik Street, Johannesburg, on payment of 2s. 6d. per print.

One copy of the specifications and conditions of tender without drawings is available for loan from the Branch to United Kingdom firms in order of receipt of application.

Notes and News

Vacancies for Draughtsmen.—Applications are invited to the posts of draughtsmen, under 30 years of age, required by British Railways in London. See Official Notices on page 643.

Vacancy for Deputy Chief Engineer.—Applications are invited for the post of deputy chief engineer, not exceeding 40 to 45 years of age, required by the Ulster Transport Authority. See Official Notices on page 643.

Junior and Senior Draughtsmen Required.—Applications are invited for the posts of junior and senior draughtsmen required by a firm manufacturing machine element essential for all classes of machinery. See Official Notices on page 643.

British Railways, Southern Region, Lecture & Debating Society.—The subject this year for the Prize Essay Competition of the British Railways, Southern Region, Lecture & Debating Society is "The branch line problem," and three prizes are offered to the value of £5 5s. 0d., £3 3s. 0d., and £2 2s. 0d. for the best 3,000-word essay submitted to the Society by January 11, 1954.

British Railways Coal Traffic Again Heavy.—During the week ended 6 a.m. on November 30, British Railways cleared 3,376,820 tons of coal from deep-mine pits and opencast sites, the heaviest week's forwarding since April. The weekend figure, 418,870 tons, was the highest since March. In the week ended November 21, 219,915 tons of iron and steel from the principal steelworks and 334,800 tons of iron ore were conveyed.

Improving British Canals.—Mr. J. H. Brebner, Chief Public Relations & Publicity Officer, British Transport Commission has replied in a letter to *The Times* to a statement by another correspondent that the Commission "is so far concerned with other forms of transport that it makes no special effort for the waterways at all". Between 1948 and 1952 (both years inclusive), Mr. Brebner points out, the Docks & Inland Waterways Executive of the Commission spent over £6,000,000 on maintenance of canals and related structures, plant and equipment, and an additional £1,000,000 on abnormal maintenance. During the same period, the tonnages carried on the Commission's inland waterways have increased from about 11,000,000 tons in 1948 to nearly 12,500,000 tons in 1952. Results so far available show that the 1953 figures are still improving. The financial losses which were being sustained in the operation of some of the canals before 1948, he adds, have been considerably reduced by the Commission.

Institute of Transport.—The Henry Spurrier Memorial Lecture on "Road transport and the manufacturer" will be delivered by Mr. Henry Spurrier before the Institute of Transport, on Monday, December 14, at 6.15 p.m., as recorded in out issue of November 27. Mr. Henry Spurrier, Managing Director of Leyland Motors Limited, is the son of the late Mr. Henry Spurrier, Managing Director of Leyland Motors Limited, after whom the lectures were named.

London Transport Dramatic Club Production.—The London Transport Dramatic Club on November 26-28 presented Agatha Christie's play "The Hollow" at the Rudolf Steiner Theatre, London, N.W.1. The high reputation which the club has long enjoyed was enhanced by this production under the direction of Gladys Burchell. Evelyn Peck as Lady Angkatell, Teresa Williams as the derated wife of John Criston, played by Eric Giachardi, gave excellent performances. Other parts which were of a very high standard were taken by the Misses Joan Wells as Henrietta Angkatell, Faith Vaughan as Midge Harvey, and Michael Guerin as Edward Angkatell.

York Station Staff in B.T.C. Film.—"This is York," the film made by the British Transport Commission Films Division, was given a premiere showing at the Odeon Cinema, York, to an invited audience, on November 17. The audience, who attended as the guests of Mr. H. A. Short, Chief Regional Manager, North Eastern Region, consisted of 550 leading citizens of York, including church and civic dignitaries, the army (Northern Command), principal traders, and leaders of local organisations. Mr. S. W. Jesper, Public Relations & Publicity Officer, North Eastern Region, made a speech of welcome. The programme opened with a colour film, "The Heart is Highland," an introduction to the Highlands of Scotland, also made by the B.T.C., followed by the four-minute "short," "Go Slow to Brighton." "This is York" features York Station, with most of the action in an all-day survey of the human interest behind activities such as the new signalling installation, the station announcer, station staff, the passengers, and even train spotters. The film will be shown publicly in this country as a supporting film to the main programme feature.

Institute of Transport: Education Discussion Meetings.—The first of a new series of discussion meetings arranged by the Institute of Transport took place at 80, Portland Place, London, W.1, on Wednesday, November 25. Mr. T. W. Royle, Past President and Chairman of the Institute of Transport Examinations Committee, who presided, explained the purpose of the meetings, which was to enable members of the Institute, students and graduates in particular, tutors and lecturers, and anyone else who might be interested, to discuss educational matters relating to the Institute examinations. "Transport finance and accounting: its place and treatment in the Institute's examination scheme," was selected for the first meeting and the discussion was opened by Mr. C. F. W. Saunders and Mr. R. E. G. Brown. A similar meeting has been arranged for Wednesday, January 13, 1954, at 6.0 p.m. at 80, Portland Place, London, W.1, when the subject selected will be "Elements of Statistics."

Institute of Transport. Humberside Section Annual Dinner.—Mr. A. B. B. Valentine, member of the London Transport Executive and Past President of the Institute of Transport, attended on behalf of the President, Mr. John Elliot, the annual dinner of the Humberside Section held at the Guildhall, Hull, on Tuesday, November 24, and responded to the toast "The Institute of Transport" proposed by the

At the première of the B.T.C. film "This is York." Mr. H. A. Short showing his guests a model of an L.N.E.R. Pacific; on his right is the Deputy Lord Mayor of York, Alderman J. H. Kaye

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

ULSTER TRANSPORT AUTHORITY
DEPUTY CHIEF ENGINEER

THE Ulster Transport Authority established under the Transport Act (Northern Ireland), 1948, to provide public transport services by rail and road within Northern Ireland (with certain exceptions) invite applications for the position of Deputy Chief Engineer.

Applicants should be Engineering Graduates of a recognised University and/or Corporate Members of the Institute of Mechanical Engineers or the Institute of Electrical Engineers or the Institute of Civil Engineers or equivalent qualifications and not exceeding 40/45 years of age.

The salary will be up to £2,000 per annum.

Applications should reach the undersigned not later than December 17, 1953.

T. B. ANDISON
Secretary

21, Linenhall Street,
Belfast

DRAUGHTSMEN, junior, with some experience in the preparation of engineering drawings for reproduction. Good lettering essential. London area. Five-day week. Write, stating age, experience and salary required, to Box 2, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE Director General, India Store Department, invites tenders for the supply of machines in the undermentioned groups: Lathes, Capstan, Automatic and Centre, Vertical and Horizontal Milling Machines, Hydraulic Cold Saws and Band Saws, Planers, Shapers and Slotters, Radial, Vertical and Sensitive Drilling and Tapping Machines, Semi Jig Borers, Tool Grinders, Carbide and N.S.S., Grinders, cylindrical Tool and Cutter and Universal Pantograph Profile Grinders, Grinders, shear blade and saw sharpening, Shearing Machines, Parallel, Circular and Punch, Press Brakes, folding and levelling machines, Inclinable Power and Hydraulic Presses, High Precision circular and Linear Dividing Machines, Spot Welders and Profile Projectors. Tender forms and specifications may be purchased from the Director General, India Store Department, 32-44 Edgware Road, London, W.2, at a price of 10*s.* per set, quoting reference S.3119/53/CIV.3, *after Monday December* 14, 1953. When applying for tender forms please state specifically the type or types of machines or equipment for which tender schedule(s) are required. All tenders with specifications and completed technical schedules enclosed must reach the Director General by Friday, January 15, 1954.

GANGA BRIDGE PROJECT (INDIA)
TENDER NOTICE

1. The General Manager and Chief Engineer, Ganga Bridge Project, propose to invite tenders for the construction of a Rail-cum-Road bridge across the Ganga River near Mokameh (Bihar) on the Eastern Railway.
2. Tenders will cover the following items of works for the proposed bridge:—
   (*a*) *Piers and their Foundations*:—Foundations will be required to be taken down to a depth of 170 feet in the river bed below the low water level for the main piers.
   (*b*) Fabrication, supply and erection of steel girders for the bridge.
   (*c*) Reinforced concrete roadway decking on the bridge.
3. Two tentative designs have been prepared for the proposed bridge.
   First. Consisting of nine main spans of which seven will be 600 feet each, two 500 feet each and four shore spans 104 ft. 8 in. each, centre to centre of bearings. The main spans will be balanced cantilever type with a 100 ft. cantilever arm at each end and 400 ft. suspended spans.
   Second. Consisting of fourteen main spans each 413 ft. 4 in. centre to centre of bearings and four shore spans 104 ft. 8 in. each centre to centre of bearings, simply supported at the ends.
   Tenderers will be free to quote for either or for both of the above designs and for any other alternative design that they might like to suggest to the required specifications and standards of loading.
4. Site plans and other preliminary information required by intending tenderers may be obtained from the General Manager and Chief Engineer, Ganga Bridge Project, Room No. 206, "N" Block, Raisina Road, New Delhi, on any working day after November 16, 1953, at Rs. 25*s.* per set. Any additional information required can be supplied on application.
5. Intending tenderers are advised in their own interests to study all local conditions governing the works at site, availability and sources of supply of skilled and unskilled labour and suitable building materials before tendering.
6. Tender forms, together with the necessary drawings, schedule of quantities, specifications and conditions of contracts will be available for sale from January 18, 1954, at the Project Headquarters Office at Post Office Hathidah (Mokameh, Bihar), at Rs. 100*s.* per set.
7. The Project Administration reserves the right to accept any tender even though not the lowest or to give all the works to one party or to split up the work between more than one party or to reject all the tenders without assigning any reason.

JUNIOR and Senior Draughtsmen required by old established firm about 30 miles north of London manufacturing machine element essential for all classes of machinery. Drawing office and workshop experience required, also technical training to at least O.N.C. standard. Please reply in writing giving full details of experience, age and salary required to Box 20, *Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE High Commissioner for India invites tenders for the supply of 100 *Pairs* of Wheels and Axles for Carriages and Wagons (Metre Gauge), complete with Disc Centres and Tyres, 2 ft. 4½ in. diameter on tread with 7 in. by 4 in. journals. Forms of tender may be obtained from the Director General, India Store Department, 32/44 Edgware Road, London, W.2, at a fee of 10*s.* which is not returnable. Tenders are to be delivered by 2 p.m. on Friday January 9, 1954. Please quote reference No. 200/53.

DRAUGHTSMEN, age under 30, required by British Railways, in London. Must have completed National Service and have had Workshop training experience in light Electrical and Mechanical designs desirable. Ordinary National Certificate Certain Residential and other travelling facilities. Superannuation scheme. Apply in writing only, stating experience, to Signal & Telecommunications Engineer, British Railways, London Midland Region, Euston House, Eversholt Street, London, N.W.1.

GUAQUI LA PAZ RAILWAY. Assistant accountant. Qualifications: Man who has passed intermediate examination of recognised accountancy body preferred. Knowledge of railway accounts an advantage. Preferably single between 28/35 years of age. Apply SECRETARY OF THE PERUVIAN CORPORATION, 144, Leadenhall Street, London, E.C.3.

GLOSSARY OF WOOD. A technical dictionary for all associated with timber and its uses. Ten thousand terms about timber—the common and the little known, the old and the new. Ten thousand definitions covering the entire field of timber and its uses—growth, marketing, utilisation. The commercial timbers, their qualities and uses, tools and woodworking equipment, are all here explained simply, concisely and accurately. Illustrated by many clear line drawings. Price 21*s.* net. By post 21*s.* 9*d.* Tothill Press Limited, 33 Tothill Street, London, S.W.1.

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N.E.R. HISTORY.—Twenty-Five Years of the North Eastern Railway, 1898-1922. By R. Bell, C.B.E., Assistant General Manager, N.E.R. and L.N.E.R. Companies, 1922-1943. Full cloth. Cr. 8vo. 87 pages. 10*s.* 6*d.*—*The Railway Gazette*, 33 Tothill Street, London, S.W.1

Lord Mayor of Hull, Councillor A. Richardson. The Chairman of the Section, Mr. R. Worfolk, proposed the toast "Our Guests" and Mr. S. B. Hainsworth, President of the Hull Chamber of Shipping and Commerce, responded.

Extension of Cheap Day Ticket Arrangements in Scottish Region.—British Railways, Scottish Region, announce that as from December 1 additional experimental cheap day fares are in operation from a number of stations in Scotland in connection with the extension of radius of operation of the existing facility at certain specified places. The tickets are valid daily, including Sunday, where train service permits.

Traffic Won from Air by Special Train Schedule.—For the official opening of the Rolls-Royce factory at East Kilbride on November 20 by Mr. Duncan Sandys, Minister of Supply, special arrangements were made by British Railways, London Midland and Scottish Regions, to convey the official party and guests, totalling over 80, to Scotland. A sleeping car train with buffet was provided and left Euston at 10.10 p.m. on November 19, arriving at Glasgow Central at 7.28 a.m. Colonel F. R. Fell, Public Relations Manager, Rolls-Royce Limited, had previously proposed that the party should return to London by air, but British Railways produced a schedule for a particularly fast run by rail and the party therefore returned by special train including restaurant cars with a special menu. This left Motherwell at 3.45 p.m. and arrived at Euston at 10.48 p.m., only 18 min. later than the schedule offered by air.

North Eastern Region Boxing Tournament.—British Railways, North Eastern Region, met the Army, Northern Command, in the annual boxing tournament at the York Railway Institute gymnasium on November 20. The tournament again resulted in a draw, British Railways winning five bouts and the Army five; railwaymen were the winners in the flyweight, bantamweight, featherweight (one bout), and light middleweight (two bouts) contests. The honours of the last four annual meetings also have been shared. At the end of each bout prizes were presented by Brigadier T. G. G. Cooper, Northern Command, and by Mr. H. A. Short, Chief Regional Manager.

Geo. Salter Limited to Become Public Company.—Geo. Salter & Co. Ltd. will shortly become a public company with the placing of a block of 6 per cent cumulative preference shares for Stock Exchange dealing in London and Birmingham. Mr. R. P. S. Bache, Managing Director, has explained that the object is to counter the "crippling effect of death duties and high taxation generally on family concerns such as this." For practical purposes the family nature of the business will not be affected; ordinary shares are not being placed on the market, and the shareholders are parting with only about one-third of their preference shareholdings. More than 80 per cent of the ordinary and a substantial number of the preference shares are owned by the Bache family, which is related to the founders of the business begun in Bilston, near West Bromwich, by Richard Salter in 1760. Salter's made the springs for the *Rocket*, and spring balances and springs have been their principal products, though there have been developments in other branches of engineering.

Guest, Keen & Nettlefolds: Interim Dividend.—The directors of Guest, Keen & Nettlefolds Limited have declared an interim dividend on the ordinary stock of 5 per cent for the year ending January 2 next, the same as for the previous year.

Southern Region Staff Association: Exhibition of Arts & Crafts.—The second annual exhibition of Arts & Crafts of the Southern Region Staff Association was held at Southampton from November 24-26. Mr. R. P. Biddle, Docks & Marine Manager, Southampton, attended a preview of the work, accompanied by Mrs. Biddle, who later declared the exhibition open. Mr. C. A. Humphries, Weflare Officer, British Railways, and Mr. F. D. Y. Faulkner, Public Relations & Publicity Officer, Southern Region.

Forthcoming Meetings

December 7 (*Mon.*).—Institute of Transport, Metropolitan Section, at 80, Portland Place, London, W.1, at 5.30 for 6 p.m. Annual General Meeting, followed by paper on "Automatic train control and other safety measures," by Mr. L. W. Hatley.

December 7 (*Mon.*).—Institute of Transport, Swindon Group, at the Corporation Transport Offices, at 7 p.m. Paper on "The organisation of a signal engineer's department," by Mr. L. F. Baker, British Railways, Western Region.

December 8 (*Tue.*).—South Wales & Monmouthshire Railways & Docks Lecture & Debating Society, in the Angel Hotel, Westgate Street, Cardiff, at 6.30 p.m. Paper on "Production and development in the aluminium industry," accompanied by films, by Mr. E. S. Anderson, General Manager, Northern Aluminium Co. Ltd., Rogerstone.

December 8 (*Tue.*).—Institute of Transport, Metropolitan Student & Graduate Society, at 80, Portland Place, London, W.1, at 5.30 for 6 p.m. Paper on "London fares—a basic assumption reconsidered," by Mr. C. McKenzie Cray.

December 8 (*Tue.*).—Institute of Transport, Yorkshire Section, at the Great Northern Hotel, Leeds, at 6.30 p.m. Paper on "Manchester-Sheffield-Wath electrification," by Mr. H. C. Johnson.

December 9 (*Wed.*).—Railway Students' Association at the London School of Economics & Political Science, Houghton Street, Aldwych, W.C.2, at 6.15 p.m. Paper on "The British army transportation service with special reference to railways in the Middle East," by Lt.-Colonel G. C. L. Alexander.

December 9 (*Wed.*).—Institute of Traffic Administration, London Centre, at Kingsley Hotel, Bloomsbury Way, W.C.1, at 7.15 p.m. Symposium on "Establishment and development of an industrial transport organisation."

December 9 (*Wed.*).—Institute of Transport, Southern Section, at the Harbour Offices, Town Quay, Southampton, at 5 for 5.45 p.m. Paper on "The history of the railway inspectorate," by Brigadier C. A. Langley.

December 10 (*Thu.*).—Institute of Traffic Administration, Hull Centre, at the Imperial Hotel, Hull, at 7.30 p.m. Paper on "Industrial transport," by Mr. A. Johnson.

December 10 (*Thu.*).—British Railways, Western Region, London Lecture & Debating Society, in the Headquarters Staff Dining Club, Bishop's Road, Paddington, W.2, at 5.45 p.m. Paper on "The effect on the national economy of Government policy in relation to nationalisation and the control of industry," by Mr. S. P. Chambers, Deputy Chairman, I.C.I. Limited.

December 10 (*Thu.*).—Institute of Welding, Slough Section, at the Community Centre, Farnham Road, Slough, at 7 for 7.30 p.m. Paper on "Gas welding," by Mr. F. Clark, Superintendent, General Service Section, British Oxygen Co. Ltd.

December 10 (*Thu.*).—Institute of Welding, South London Branch, at 2, Savoy Hill, London, W.C.2, at 6.30 p.m. Paper on "Hydrogen versus welding," by Mr. C. L. M. Cottrell.

December 11 (*Fri.*).—Stephenson Locomotive Society, Scottish Area, at 25, Charlotte Square, Edinburgh, at 7 p.m. Talk on "North British characteristics," by Mr. W. Hennigan.

December 12 (*Sat.*).—Stephenson Locomotive Society, North Western Area, at the Manchester Geographical Society's Rooms, at 6.15 p.m. Illustrated talk on "French locomotives of the former Est, P.L.M., and P.O.", by Mr. C. H. Dickson.

December 14 (*Mon.*).—Institute of Transport, at the Jarvis Hall (R.I.B.A.), 66, Portland Place, W.1, at 5.45 p.m. Henry Spurrier Memorial Lecture by Mr. Henry Spurrier.

December 15 (*Tue.*).—Institute of Transport, Essex Group, at the Shire Hall, Chelmsford. Paper on "Cross-country travel by public services," by Mr. A. E. Wallis.

December 16 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society, at the Chapter House, St. Thomas Street, London Bridge, S.E.1, at 5.45 for 6 p.m. Debate, "That the employment of more women in responsible positions would be beneficial to British Railways." The debate is arranged in conjunction with British Railways, Western Region, London Lecture & Debating Society.

December 16 (*Wed.*).—Permanent Way Institution, at the British Transport Commission Headquarters, 222, Marylebone Road, London, N.W.1, at 5.45 p.m. Illustrated paper on "Euston improvements," by Mr. A. Ridley, London Midland Region.

December 16 (*Wed*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, at 5.30 p.m. Paper on "Some questions about the steam locomotive," by Professor W. A. Tuplin.

December 16 (*Wed.*).—Permanent Way Institution, Newcastle Section, at the Lecture Hall of the District Engineer's Office, British Railways, Forth Banks, Newcastle-upon-Tyne, at 6.30 p.m. Annual general meeting, followed by brains trust.

Railway Stock Market

Buying in stock markets has been less vigorous, and price movements in most sections were small and indefinite, although British Funds have been inclined to reflect renewed talk of lower bank rate prospects. Evidence of the increasing competition in export markets has made for a certain amount of caution, and engineering shares in particular were easier earlier in the week on the threat of the token strike by the engineers.

More dividend increases have been announced, but generally they had already been discounted by earlier rises in the shares. The increases come mostly from companies which have distributed only a moderate part of their earnings for years and who feel that a relaxation of this policy is justified. On the other hand, some recent financial results emphasise that earnings can now show sharp variations from year to year because of the much more competitive conditions prevailing, and that dividends as well must be expected to fluctuate more than in recent years. A feature has been better demand for commodity shares, notably rubbers and teas, and also for gold shares on the view that they may offer the biggest scope for capital appreciation in 1954.

Business in foreign rails has been on a limited scale. There was again a good turnover in United of Havana stocks on estimates of break-up values and both the 4 per cent "A" and 4 per cent "B" stocks have been firm. On the other hand, the 5 per cent second income stock eased to 39¼ and the consolidated stock to 6⅛ on suggestions that some time might have to elapse before there is a payout for the junior stocks.

Antofagasta have been steadier at 8½ with the preference stock 42½. Mexican Central "A" debentures have transferred around 78. Nitrate Rails shares were 21s. 3d.; and San Paulo ordinary units 5s. Manila Railway issues were less active although they are regarded as having interesting possibilities for the future because they are much under-valued, assuming there is a full settlement in respect of the holding in Manila Railroad bonds, which has been long delayed but is expected next year. The "A" debentures were 85 and the preference shares 9s.

Canadian Pacifics attracted buyers and strengthened to $42; the 4 per cent preference stock was £69¾ and 4 per cent debentures £84¼. There was again more business in White Pass, but the no par value shares have reacted to $27 at the time of going to press, and the convertible debentures to £97.

Among Indian stocks, Barsi again attracted buyers on break-up value estimates and transferred up to 124½.

Chilian Northern 5 per cent debentures were dealt in up to 29¼, Dorada Railway ordinary stock at 60, and International of Central America no par value shares at $13½. Costa Rica ordinary stock was quoted at 11 and the 6½ per cent second debentures at 62½.

Guayaquil & Quito 5 per cent first bonds were £40, and Paraguay Central prior debentures 23½.

In other directions, Nyasaland Railways 3½ per cent debentures were 74½xd and Emu Bay 4½ per cent debentures 57½.

Market talk that some companies are likely to relax the very conservative dividend policy they have followed in the past has drawn rather more attention to road transport shares. West Riding were 27s., Southdown 30s. 6d., and Lancashire Transport 51s. 6d. Birmingham & District were outstanding with an advance of 10s. to 90s. on the proposed bonus. British Electric Traction deferred 5s. units were strong at 37s.

As was to be expected, engineering and kindred shares were quiet and easier earlier in the week when hentiment was affected by threat of the strike. Guest Keen receded further to 49s. 9d., Tube Investments to 61s. 3d. and Cammell Laird 5s. shares to 14s. 1½d., John Brown receded to 35s. 6d. but generally there was little selling and the lower prices were attributed to falling off in demand. Ruston & Hornsby were 42s. 3d., T. W. Ward 82s. and Babcock & Wilcox 47s. 3d. Vickers were 51s. 1½d. and British Aluminium 36s. 9d.

Among shares of locomotive builders and engineers, Beyer Peacock were easier at 30s., but Charles Roberts 5s. shares firmed up to 17s. 10½d. Birmingham Carriage were 30s. 9d., Hurst Nelson 42s., and North British Locomotive 13s., while G.D. Peters 5s. shares were quoted at 21s. 10½d. Gloucester Wagon 10s. shares were 16s, Vulcan Foundry 23s. 3d. and Wagon Repairs 5s. shares 15s. 1½d.